FINAL TECHNICAL REPORT

AWARD NO: 01HQAG0031

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Title of Recipient's Application:	Cooperative Central and Southeast US Integrated Seismic Network - USC
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ABSTRACT

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COOPERATIVE CENTRAL AND SOUTHEAST US INTEGRATED SEISMIC NETWORK - USC

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Routine seismic monitoring for the central and southeast US is carried out through the "Cooperative Central and Southeast US Integrated Seismic Network". As part of the program, the South Carolina Seismic Network (SCSN) headquartered at the University of South Carolina (USC) routinely monitors seismicity in South Carolina. This report provides a technical summary of seismic monitoring in South Carolina during 2001 – 2003. In South Carolina SCSN monitors tectonic earthquakes as well as reservoir-induced earthquakes. The tectonic earthquakes are mostly concentrated in Middleton Place Summerville Seismic Zone (MPSSZ) near Charleston. The reservoir induced earthquakes are located around Lakes Jocassee, and Keowee, and Bad Creek reservoir in northwestern SC, and Monticello reservoir in central SC. Any earthquakes that occur in other parts of the state are also recorded and located. The data from all parts of SC except the Coastal Plain are continually recorded digitally through the "Earthworm" system at USC. Continuous digital recording through the same system of the data from the Coastal Plain is done at Charleston Southern University (CSU) in Summerville, and accessed via the Internet from USC. These data are archived at USC and also transferred to USGS, Golden via CERI, Memphis. The phase data and locations are sent to Virginia Tech for compilation in the annual Southeast US Seismic Network (SEUSSN) bulletins. Additionally, the SCSN publishes an annual bulletin which can be obtained from its website at http://scsn.seis.sc.edu/bulletin/bulletin.html. During 2001 - 2003, 230 events were located that included 57 in 2001, 135 in 2002, and 38 in 2003. Out of these 230 events, 70 were associated with MPSSZ, 150 were reservoir- induced, and 10 occurred sporadically in other parts of the state. Also during 2001 - 2003 two earthquakes were recorded and located off the coast of South Carolina. The recording of these earthquakes in 2002 is significant because in over two decades of instrumental recording, an earthquake was recorded off the coast of South Carolina for the first time.

INTRODUCTION

The “Cooperative Central and Southeast US Integrated Seismic Network” conducts routine seismic monitoring for the central and southeast US. The South Carolina Seismic Network (SCSN) headquartered at the University of South Carolina (USC) routinely monitors seismicity in South Carolina as part of this program. In South Carolina SCSN monitors tectonic earthquakes as well as reservoir-induced earthquakes. Support for monitoring earthquakes near reservoirs and other parts of the state is obtained from other sources and not from the USGS. The tectonic earthquakes are mostly concentrated in Middleton Place Summerville Seismic Zone (MPSSZ) near Charleston, the focus of the USGS support. The reservoir induced earthquakes are located around Lakes Jocassee, and Keowee, and Bad Creek reservoir in northwestern SC, and Monticello reservoir in central SC. Monitoring near Lakes Jocassee and Keowee was discontinued from May 22, 2003 because of a cessation in support from Duke Power Company. Earthquakes that occur in other parts of the state are also recorded and located. The data from all parts of SC are continually recorded digitally and sent to USGS Golden and also archived at USC. Additionally, the SCSN publishes an annual bulletin which can be obtained from its website at http://scsn.seis.sc.edu/bulletin/bulletin.html. This report provides a technical summary of seismic monitoring in South Carolina during 2001 – 2003.

SOUTH CAROLINA SEISMIC NETWORK OPERATION

Station Locations

During 2001 – 2003, the SCSN comprised of 16 – 23 stations. Figure 1a-c shows the configuration of stations in each year. SCSN had 23 stations in 2001 (Figure 1a), 20 stations in 2002 (Figure 1b), and 16 stations in 2003 (Figure 1c). During 2001 there were six stations

in the Lake Jocassee area, and four stations in the “main net”. In 2002 there were four stations in the Lake Jocassee area, and three stations in the “main net”, whereas in 2003 there were no stations in the Lake Jocassee area and three stations in the “main net”.

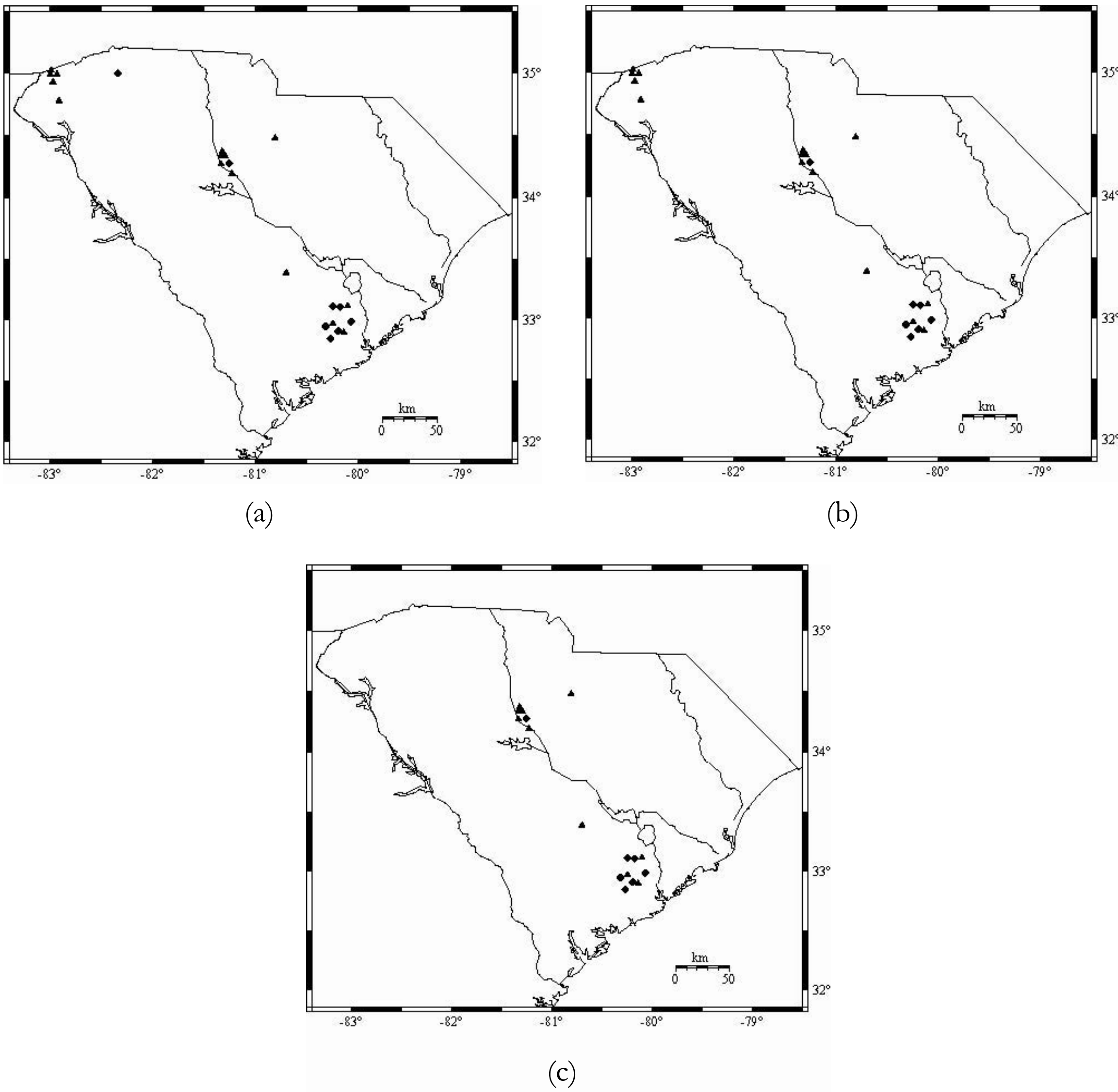


Figure 1: Distribution of stations/subnets of the South Carolina Seismic Network during (a) 2001 (b) 2002 (c) 2003. Triangles (▲) represent single component stations while diamonds (♦) represent three component stations.

However, during 2001 – 2003 the Coastal Plain network and Monticello Reservoir sub-network continuously had eight and five stations respectively. The stations of the “main”

SCSN (JSC, LHS and SFQ) (Figure 2) are located in the Piedmont and COW is in the upper Coastal Plain. Data from these stations were telemetered and recorded at USC. The station at Sandy Flats Quarry (SFQ) was installed by Hanson Aggregates East, Inc. to fulfill regulatory requirements of the South Carolina Department of Health and Environment to monitor any seismic activity due to mining operations. The station was operational between July 18, 2001 to July 4, 2002. Data from SFQ were sent by a dedicated telephone line to USC where it was recorded on a Helicorder. The Coastal Plain Seismic Network (Figure 3) consisted of three bore-hole stations (CSB, RGR, HBF), and six surface stations, CSU, DRC, MGS, SVS, TWB and WAS. These covered the Middleton Place Summerville Seismic Zone (MPSSZ) in the meizoseismal area of the 1886 Charleston earthquake. Data from these stations were telemetered and recorded at Charleston Southern University and also transmitted to USC.

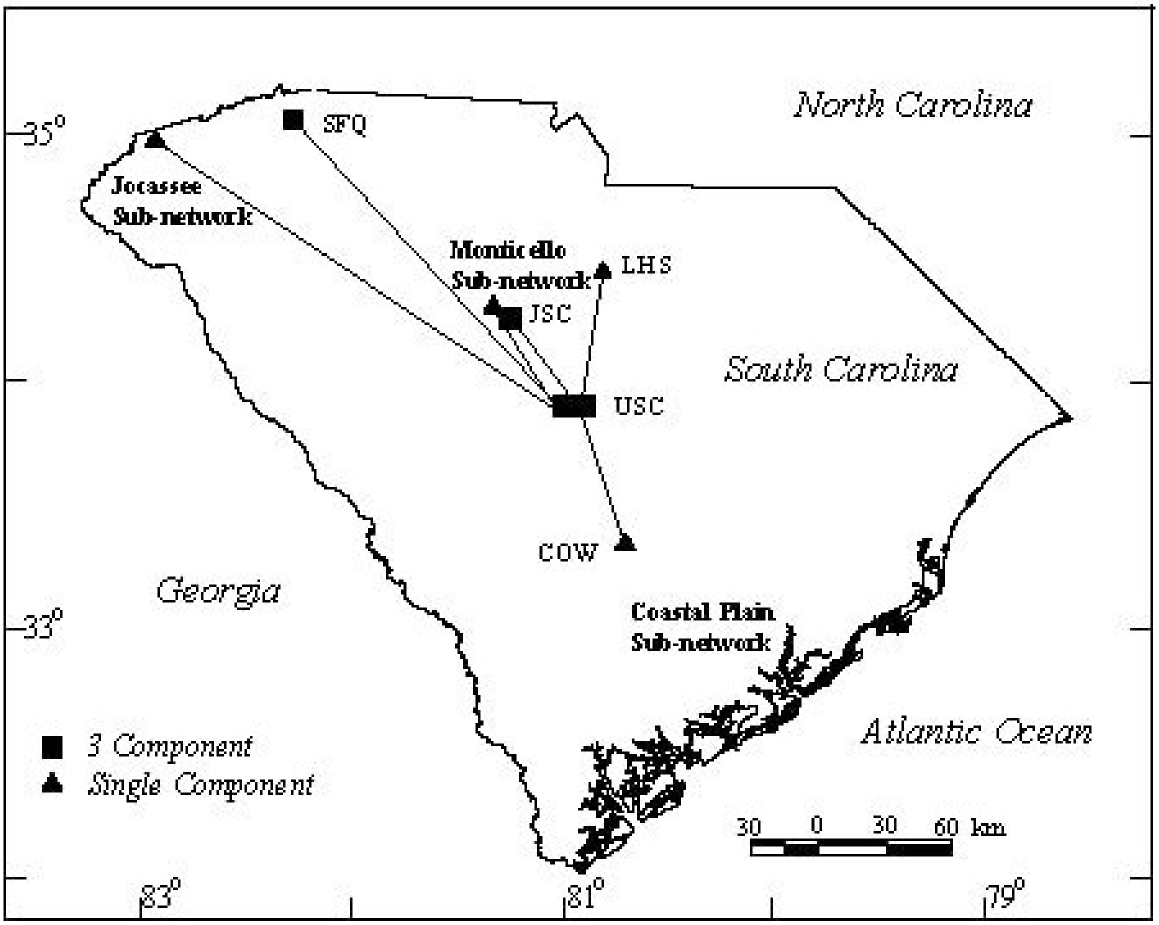


Figure 2: Stations of the Main Network (JSC, COW, LHS, SFQ) and their telemetry routes.

The configuration of stations in the vicinity of the Monticello Reservoir is shown in Figure 4. The stations of the Lake Jocassee network (only during 2001 – 2002) were located so as to monitor seismicity around Lakes Jocassee, Keowee and Bad Creek Reservoir (Figure 5). Duke Engineering and Services, Inc., maintained a separate recording facility at the Jocassee Hydroelectric Station near Jocassee Dam until June 2001. Data from the five station Monticello Reservoir sub-network were telemetered and recorded at USC. Data from BG3, MMC, and SMT were recorded digitally at the Jocassee Dam. These data, together with data from CCK and JVW were telemetered and recorded at the USC.

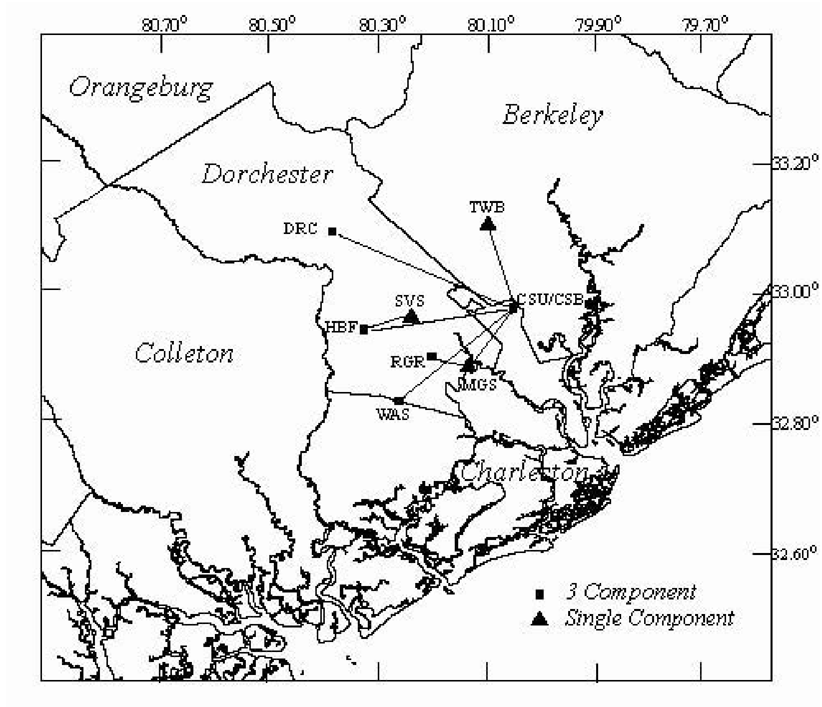


Figure 3: Stations of the Coastal Plain Seismic Network and their telemetry routes.

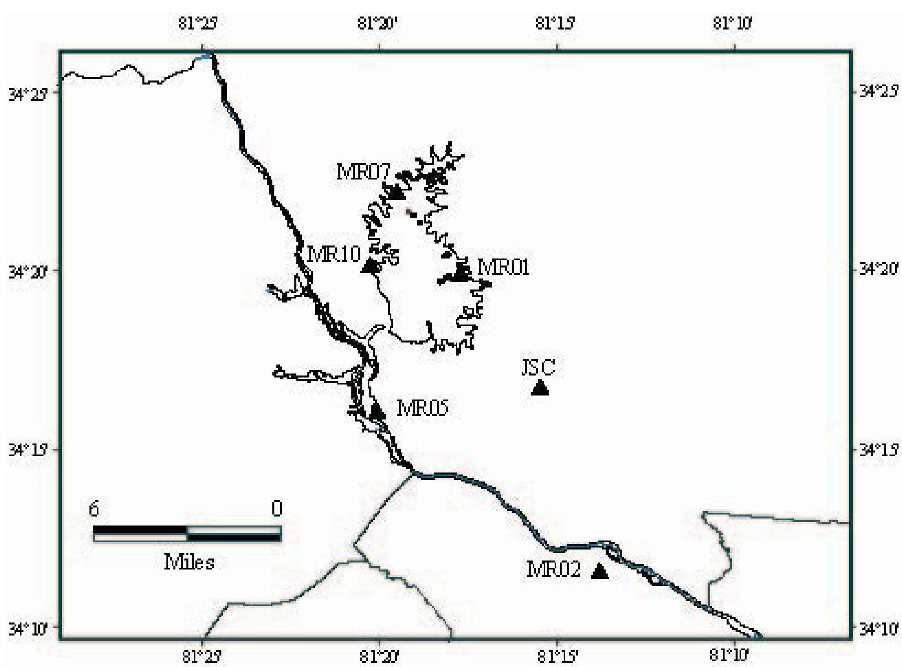


Figure 4: Stations of the Monticello Reservoir sub-network.

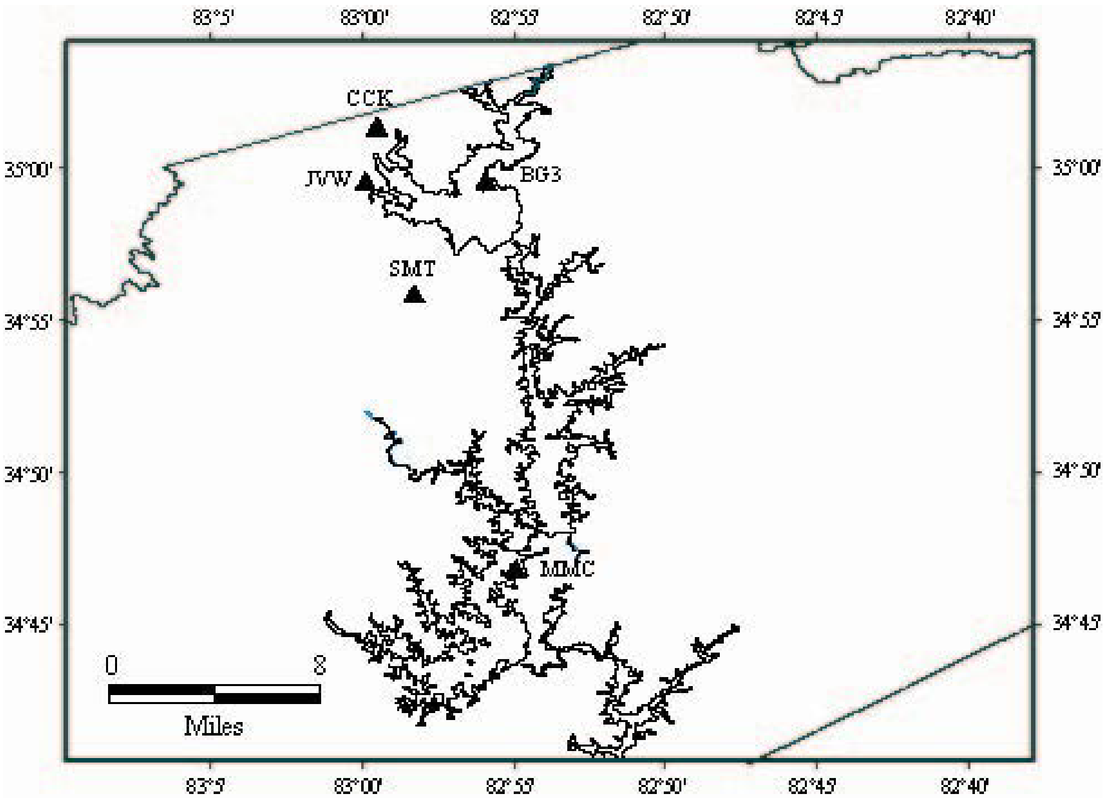


Figure 5: Stations of the Jocassee sub-network.

Recording Facilities

Digital data were recorded continuously at USC on PC-based system at 50 samples/second. To facilitate easier storage of the continuous data being recorded at USC, a DAT tape drive was installed on our PCSUDS analysis workstation. This tape drive can store approximately 2 gigabytes of data on a single tape. Accumulating data at the rate of 288 Mb per day, the new tape drive has given us the ability to mass dump data each morning from hard disk to tape. A backlog of 30 days data is maintained at the present time.

At USC data are also recorded on Helicorders. During 2001 there were five Helicorders, of which one was used to record data from stations in the Coastal Plain, one was devoted to a Piedmont station, and the rest were dedicated to data from the induced seismicity sub-networks. In 2002 there were three Helicorders, dedicated for each of the

seismically active regions mentioned above, whereas in 2003 there were two Helicorders. Data from the Coastal Plain stations were also recorded on Helicorders at CSU.

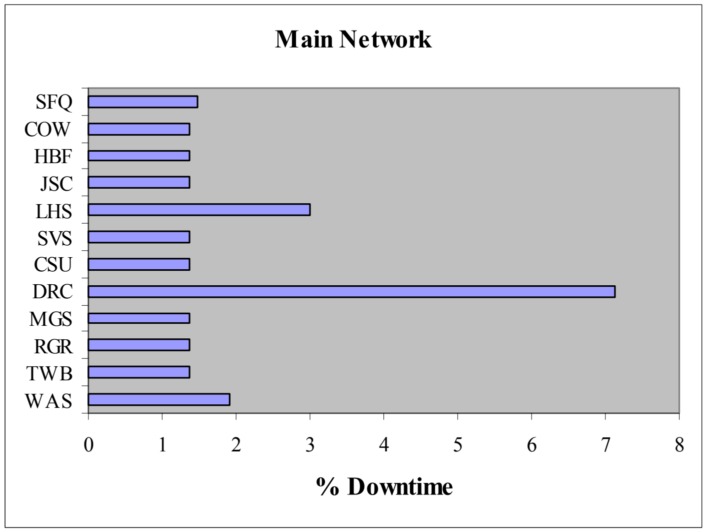
In October of 1998, the USGS initiated the new phase of cooperative seismic monitoring. The recording operations of both the Charleston Southern University and USC facilities were augmented with the installation of "Earthworm". Earthworm is a PC-based, event triggered and short term continuous data recording system that utilized the Internet for data transfer and sharing. This allows data from the SCSN to be shared with networks at CERI (Memphis) and the USGS in Golden, Colorado as part of the Advanced National Seismic System (ANSS) for the Central and Southeast US region. It also gives the main data analysis group at USC the ability to import data from stations throughout the southeast, thereby enhancing our event detection and location capabilities. Currently the trace data from Earthworm is transferred in near real time to USGS Golden.

Operational Status

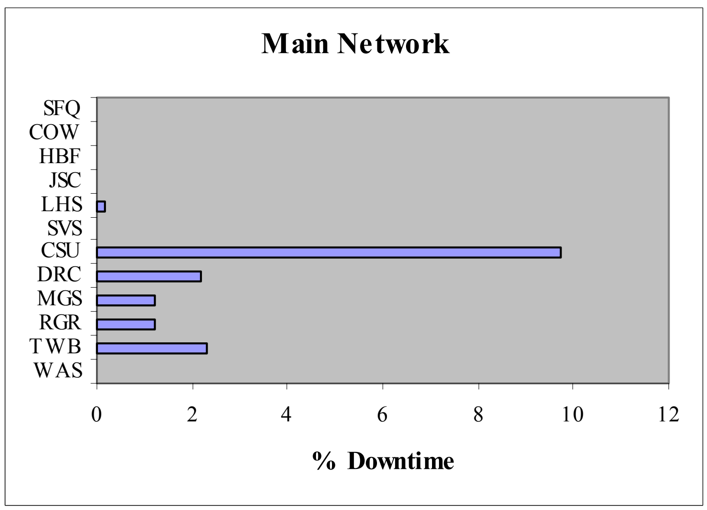
Yearly operational status of the stations of the main SCSN during 2001 - 2003 is shown in Figure 6a - c. Most of the stations were completely operational throughout each of the years. The downtime ranged from 1.5% to 7% in 2001, 0% to ~10% in 2002, and 0% to ~11% in 2003.

The yearly operational status of the sub-nets at Lakes Jocassee and Monticello Reservoirs are shown in Figure 7a – b and Figures 8a – c respectively. In the Lake Jocassee sub-network the station BG3 was in-operational throughout 2001 whereas SMT was in-operational throughout 2002. The Jocassee sub-net experienced downtimes ranging from 1% to 70% in 2001. It was fully operational in 2002. In the Monticello sub-network the station MR05 was in-operational in 2003. The downtimes of the Monticello sub-network ranged from 1% to 7% in 2001, 0% to 0.27% in 2002, and 0% to 5% in 2003.

(a)



(b)



(c)

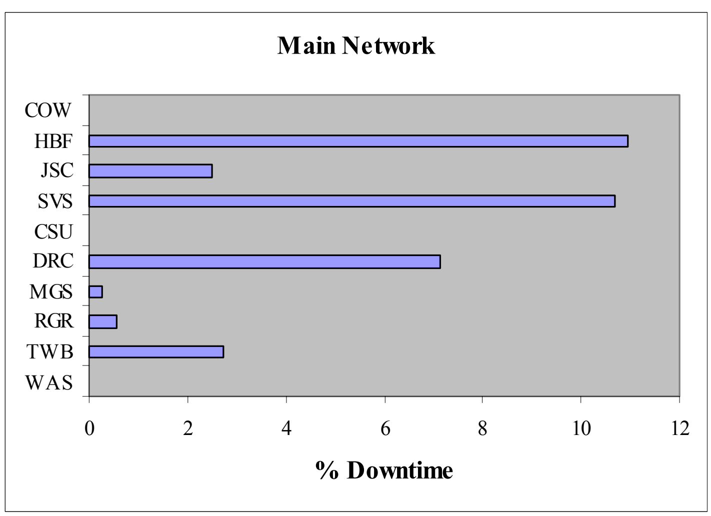
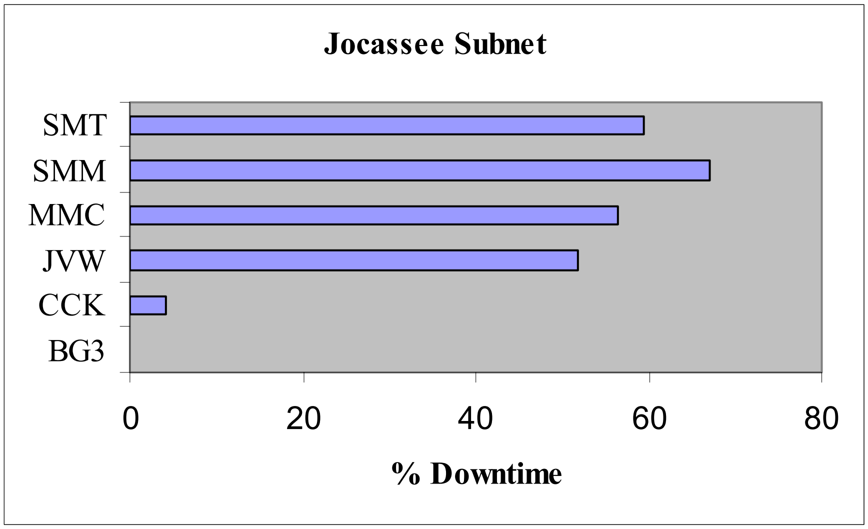


Figure 6: Operational status of the main network of SCSN in (a) 2001 (b) 2002 (c) 2003.

(a)



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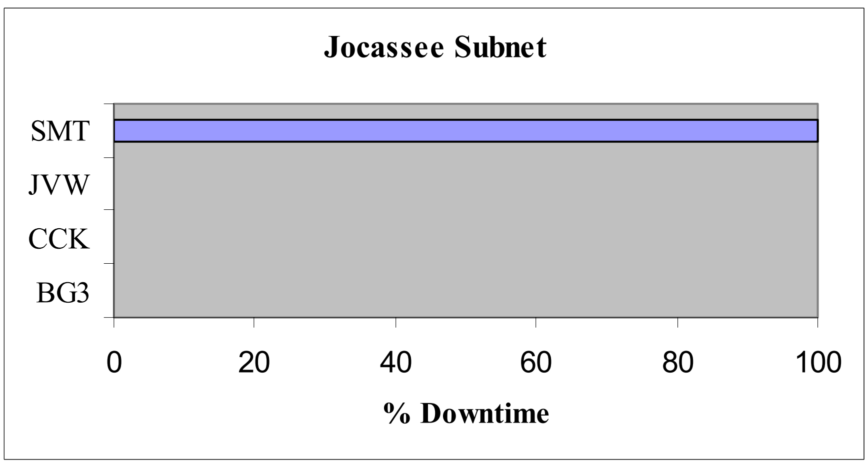
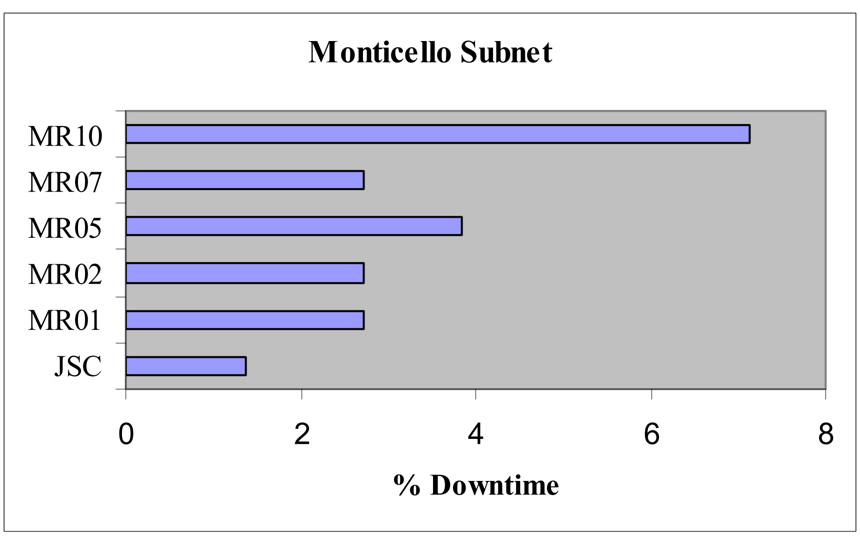
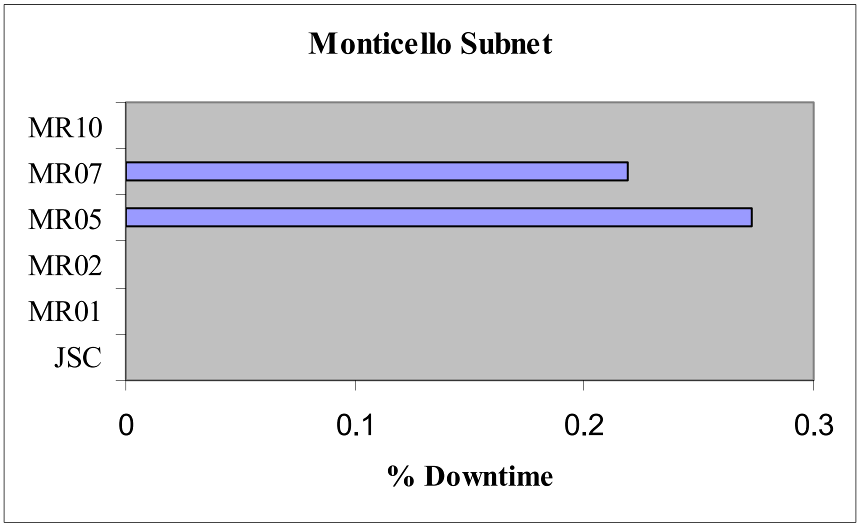


Figure 7: Operational status of the Jocassee sub-network in (a) 2001 (b) 2002.

(a)



(b)



(c)

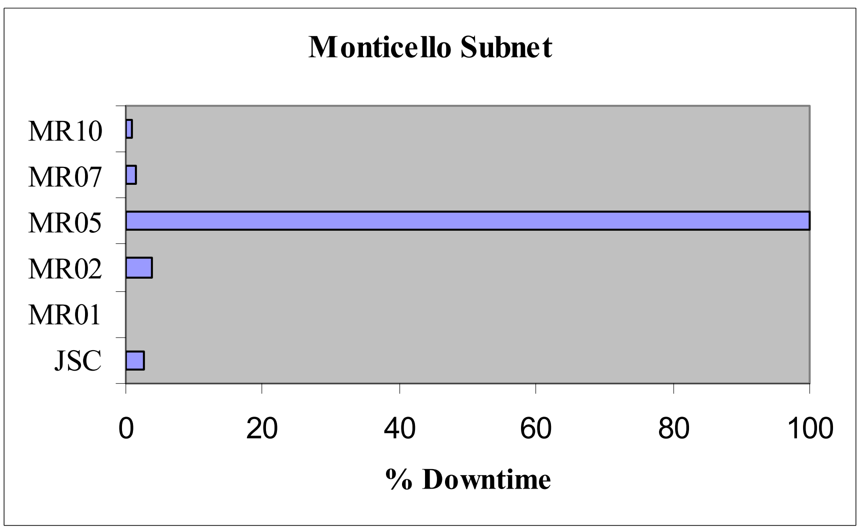


Figure 8: Operational status of the Monticello sub-network in (a) 2001 (b) 2002 (c) 2003.

Data Analyses

Data are analyzed at the USC's seismological laboratory. Identification of blasting activity, documentation of regional and teleseismic events, location and analyses of local earthquakes form a part of the routine analyses. The increased hard disk storage capacity of the new digital recording system allowed for more flexibility in the event triggering formula for the total network. The present configuration of triggering operators consists of six

separate triggering parameters encompassing the several sub-networks and the main network and some combinations. This increased triggering has allowed for the recording and locating of events of $M_L < 1.0$.

The data are processed using the Seismic Analyses Code (SAC) and Pascal Quicklook programs on the Sun workstations. Hypocentral locations are obtained using HYPOELLIPSE programs with an appropriate velocity model for each region. Format of the HYPOELLIPSE output is given in Table 1. Event magnitudes are determined using the following relation:

$$M_L = -1.83 + 2.04 \log D$$

where D is the signal duration in seconds.

The results of seismic monitoring in the state during 2001 - 2003 is presented in the next section.

SOUTH CAROLINA SEISMICITY: 2001 – 2003

In South Carolina SCSN monitors tectonic earthquakes as well as reservoir-induced earthquakes. The tectonic earthquakes are mostly concentrated in Middleton Place Summerville Seismic Zone (MPSSZ) near Charleston. The reservoir induced earthquakes are located around Lakes Jocassee, and Keowee, and Bad Creek reservoir in northwestern SC, and Monticello reservoir in central SC. Any earthquakes that occur in other parts of the state are also recorded and located. A map with all the earthquakes located in South Carolina during 2001 – 2003 is shown in Figure 9.

During 2001 - 2003, 230 events were located that included 57 in 2001, 135 in 2002, and 38 in 2003 (Tables 2 – 4). Out of these 230 events, 70 were associated with MPSSZ, 150 were reservoir-induced, and 10 occurred sporadically in other parts of the state. Among the

earthquakes in MPSSZ during 2001 – 2003 (Figure 10), 11 had $M_L \geq 2.0$. Figure 11 shows the locations of these earthquakes and the fault plane solutions of the five well recorded ones among them. The depth of earthquakes in MPSSZ during 2001 – 2003 ranged between 1 – 12 km (Figure 12). Majority of the earthquakes (46 out of 70) occurred between 4 – 8 km out of which 16 occurred between 4 – 6 km and 30 occurred between 6 – 8 km (Figure 12). Among the 150 reservoir-induced earthquakes during 2001 - 2003, 10 had $M_L \geq 1.5$. Also during 2001 – 2003 there were 15 felt earthquakes.

Also during 2001 - 2003 two earthquakes were recorded and located off the coast of South Carolina. The recording of these earthquakes in 2002 is significant because in over two decades of instrumental recording, an earthquake was recorded off the coast of South Carolina for the first time. Detailed description of seismicity in each year is provided next.

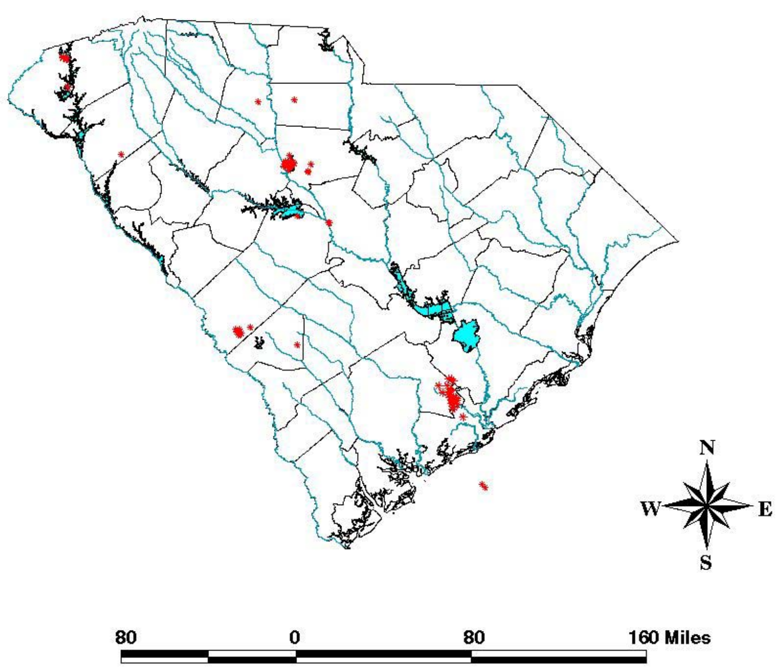


Figure 9: Map of South Carolina showing cumulative seismicity during 2001 – 2003 (red stars).

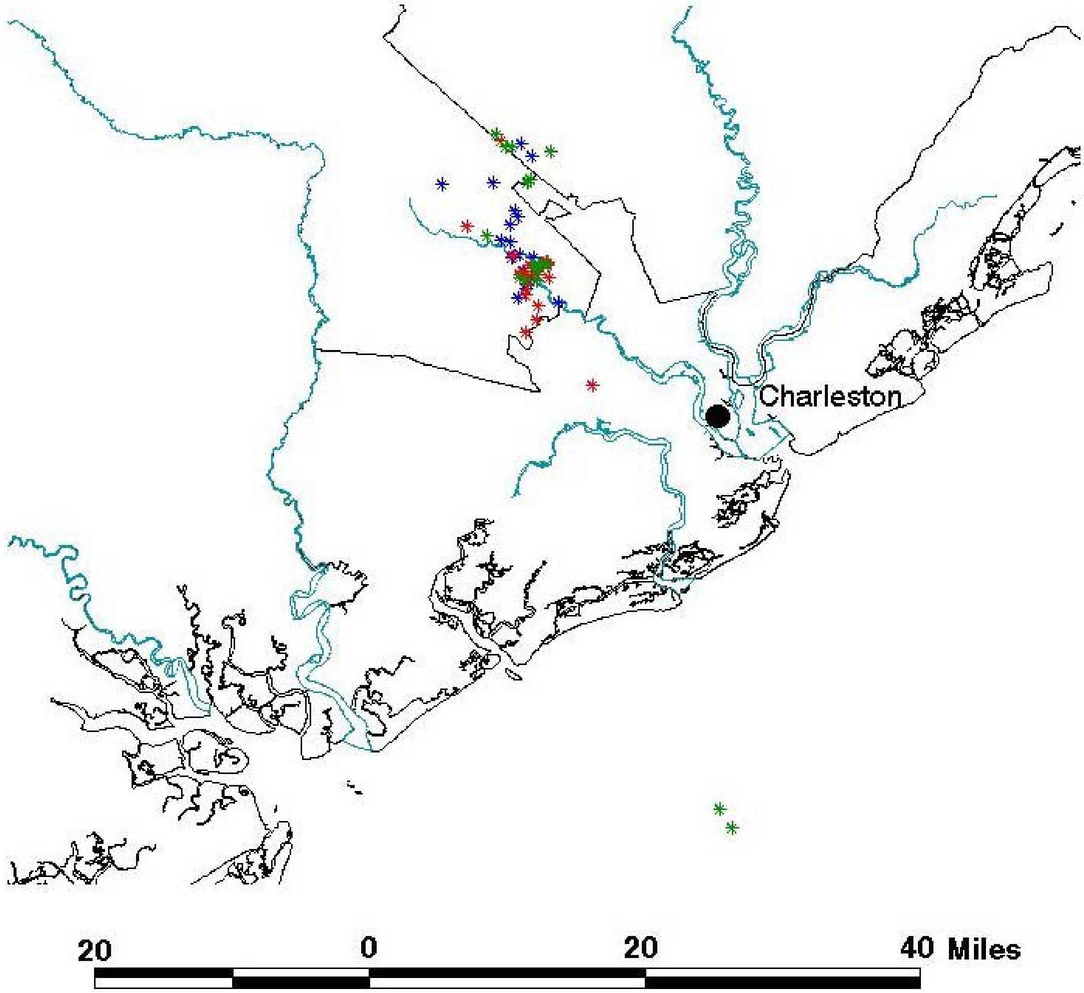


Figure 10: Map of MPSSZ showing earthquakes during 2001 – 2003. Blue – Earthquakes in 2001, Green – Earthquakes in 2002, Red – Earthquakes in 2003.

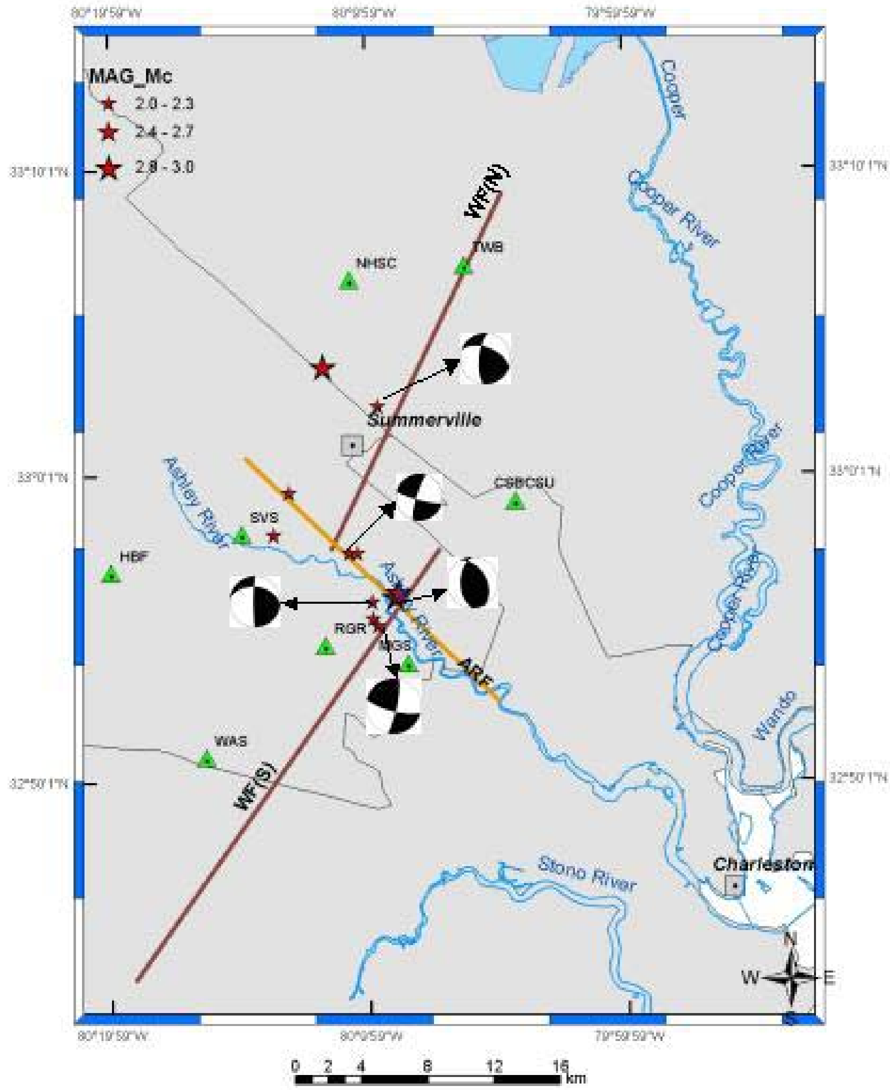


Figure 11: Map of MPSSZ showing earthquakes of M ≥ 2.0 during 2001 – 2003 (red stars). Green triangles represent locations of stations in the Coastal Plain sub-network. Grey squares represent locations of major towns. The major seismogenic faults in the region are: Woodstock fault North (WF(N)), Woodstock fault South (WF(S)) (solid brown lines), and Ashley River fault (ARF) (solid orange line). Fault plane solutions of five well recorded earthquakes are shown with corresponding beach balls.

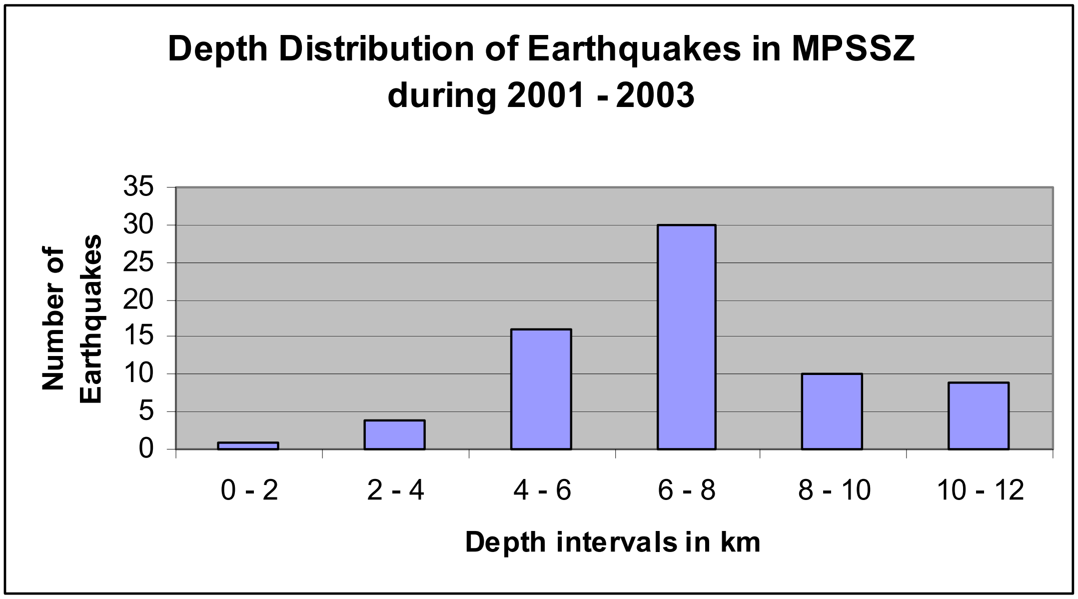


Figure 12: Depth distribution of earthquakes in MPSSZ during 2001 – 2003.

South Carolina Seismicity - 2001

Nine felt earthquakes occurred in South Carolina during 2001. The largest, M_L 2.8 event occurred in MPSSZ on December 23, 2001.

Aside from these, low level activity continued in the MPSSZ (30 located events) and near Lakes Keowee and Jocassee (3 located events). 18 events with magnitudes less than 2.0 occurred near the Monticello Reservoir. Seismicity in the different regions is discussed below.

Middleton Place Summerville Seismic Zone

The MPSSZ continued to be the most active (non RIS) seismic source zone in the Coastal Plain in 2001 (Figure 13). There was a marked increase in the seismicity at MPSSZ in the year 2001 compared to previous years. Thirty events were located with magnitudes ranging between M_L = 0.9 and M_L = 2.8 at depths shallower than 12 km (Table 2, Figure 13). Temporally, the seismicity was distributed throughout the year (SCSN Bulletin, 2001).

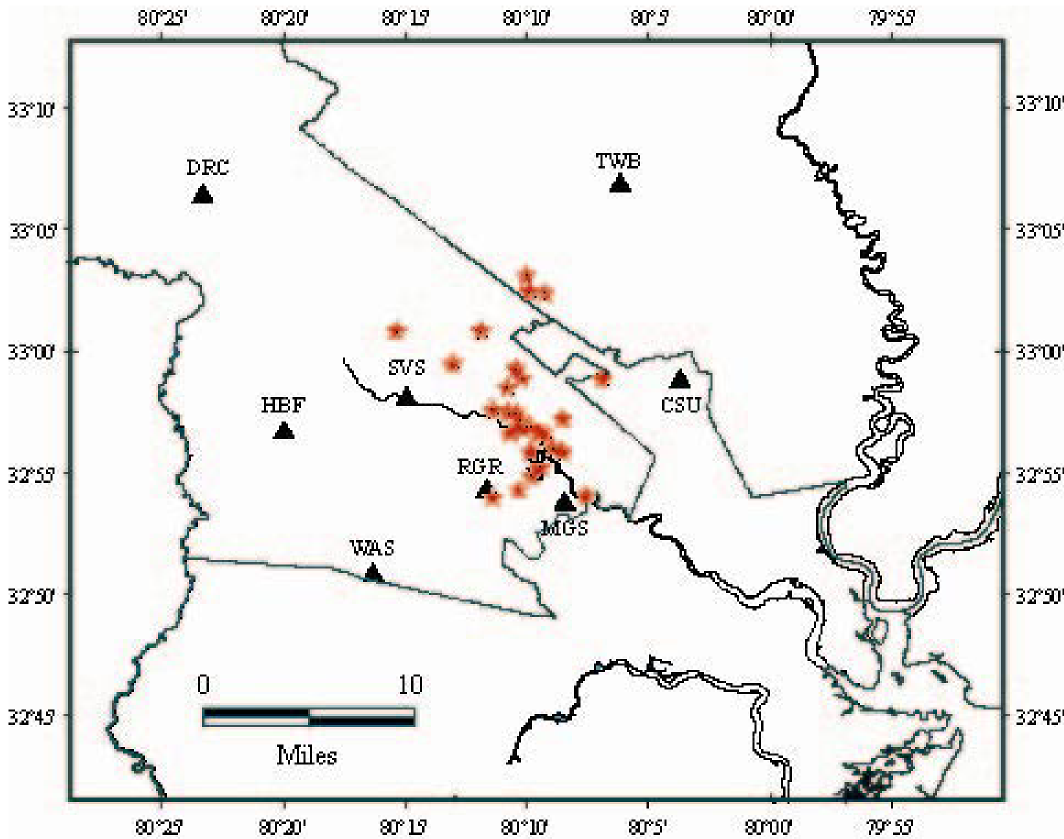


Figure 13: Seismicity in the MPSSZ during 2001 (red stars). Station locations are shown by solid triangles.

Other Tectonic Activity

Eight felt events were located outside the MPSSZ, Monticello Reservoir and Lakes Jocassee and Keowee in 2001 (Table 2, Figure 14). Four of them were located near Savannah River Site on November 8, 2001, with magnitudes in the range of M_L 1.0 and 2.5 (S). One M_L 2.1 event was located in Union County on March 18, 2001 (U), one M_L 1.8 in Chester County on June 11, 2001 (C), one M_L 1.9 in Anderson County on August 17, 2001 (A).

Although most of the events recorded by the Monticello Reservoir Network were associated with the reservoir, one earthquake was located about 10 km southeast of the reservoir in Fairfield county (Figure 15). This earthquake occurred at ~3.3 km, and the

maximum magnitude was M_L 1.0. Earthquakes at this location had been observed in 1995, 1996, 1998, 1999 and 2000 appear to be associated with the Rion Pluton.

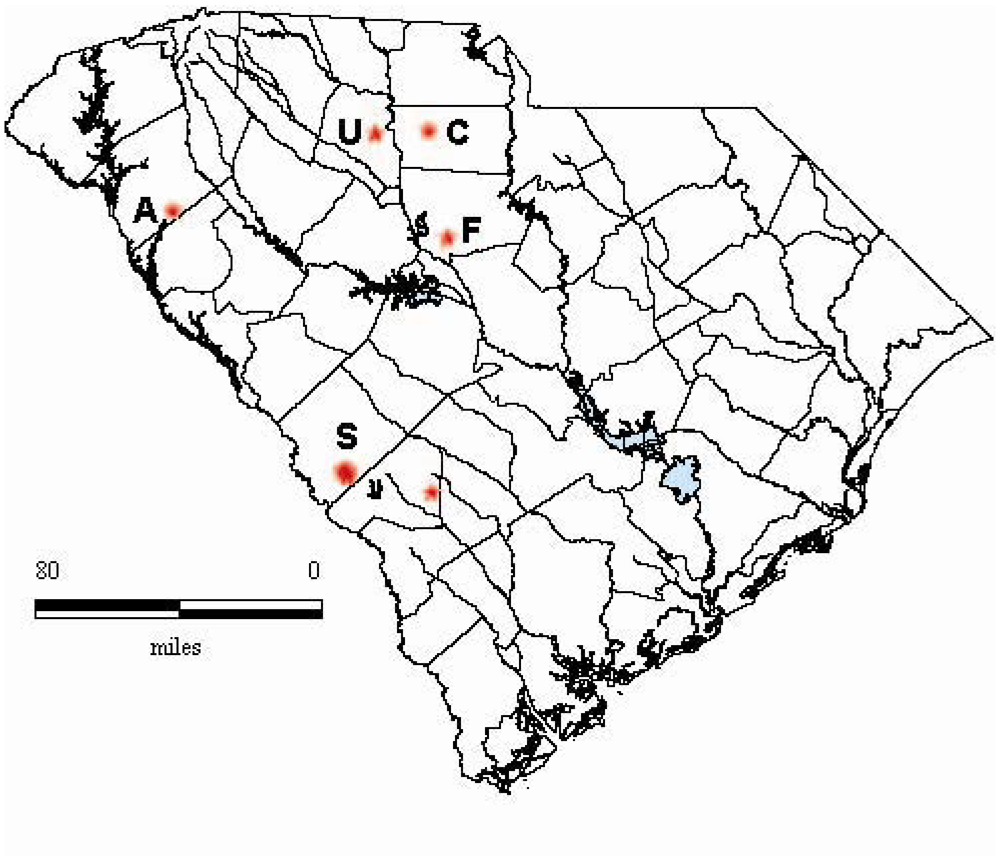


Figure 14: Seismicity in other parts of South Carolina during 2001 (red stars).

Reservoir Induced Seismicity

Monticello Reservoir

Eighteen earthquakes were located near Monticello Reservoir area during 2001 (Table 2). They all had a M_L < 2.0. One of these events was related to the Rion Pluton. Seventeen events were located within the reservoir, between stations MR10 and MR01 (Figure 15). Except for one event, all depths were shallower than 3 km. There was a marked increase in the number of earthquakes in the month of April (SCSN Bulletin, 2001).

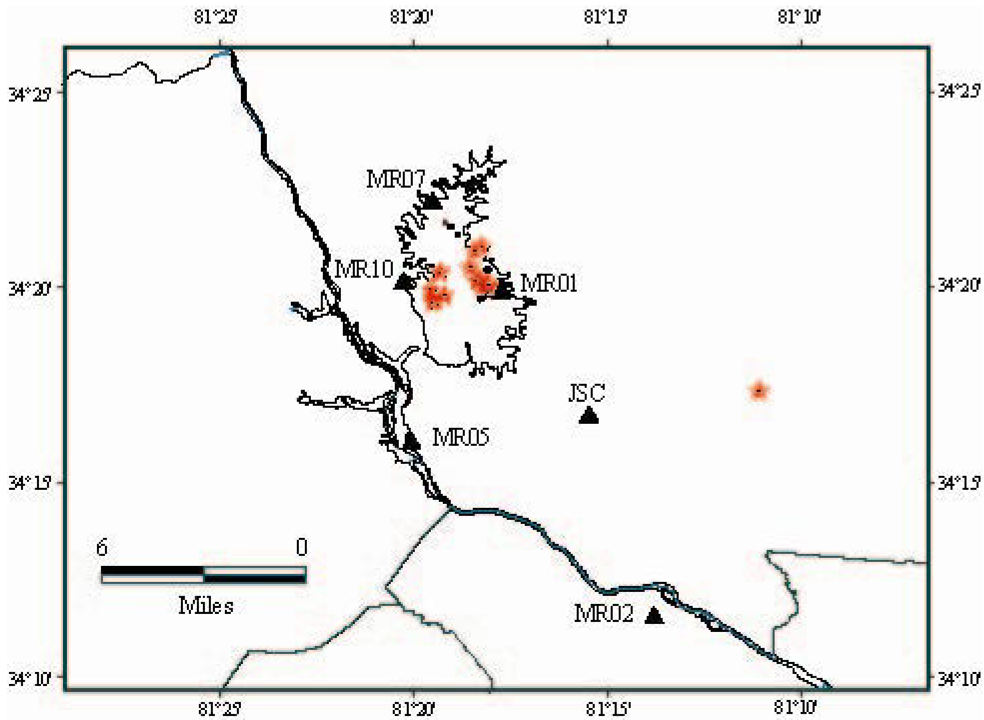


Figure 15: Seismicity near the Monticello Reservoir during 2001 (red stars). Station locations are shown by solid triangles.

Lake Jocassee

Seismicity at lake Jocassee continued at a low level during 2001 (Table 2). All three located events recorded by the Jocassee sub-network were in the vicinity of Lake Jocassee (Figure 16) and located at depths less than 3.5 km (Table 2). A M_L 2.2 event was located on June 28, 2001. The earthquakes occurred in the first half of the year (SCSN Bulletin, 2001).

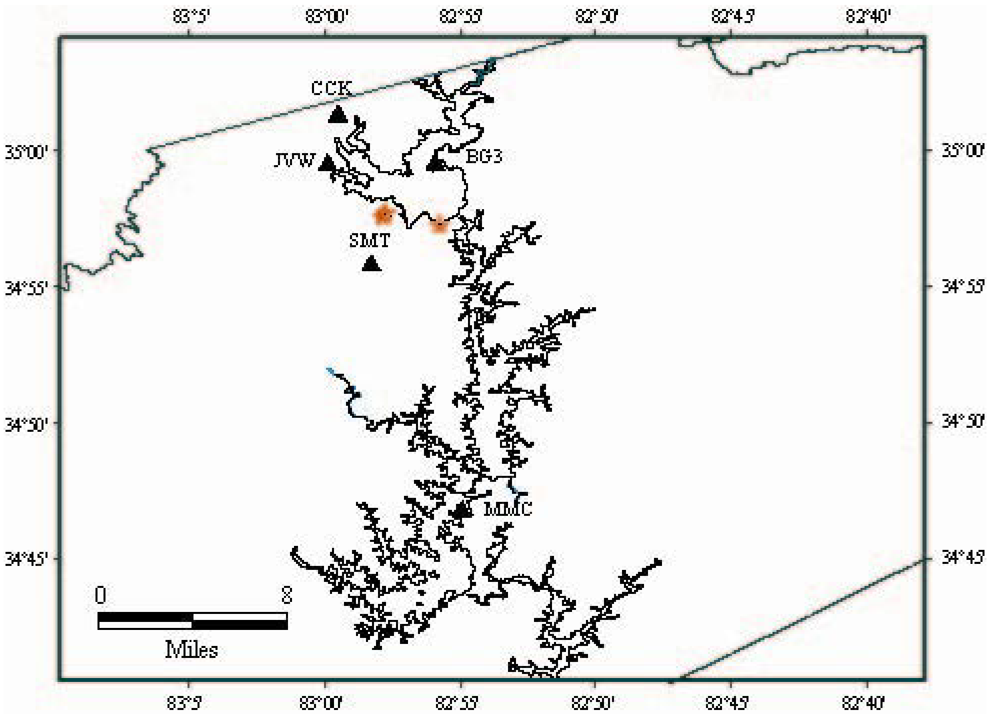


Figure 16: Seismicity in the Lake Jocassee area during 2001 (red stars). Station locations are shown as solid triangles.

Lake Keowee

In 2001 no earthquakes were recorded around Lake Keowee (Figure 16).

Bad Creek

No events were located near Bad Creek Reservoir in 2001 (Figure 16).

South Carolina Seismicity - 2002

Four felt earthquakes occurred in South Carolina during 2002 of which two occurred offshore Seabrook Island, one on the premises of Savannah River Site, and one in MPSSZ. The largest, M_L 4.3 event occurred offshore of Seabrook Island on November 11, 2002. Locations of the earthquakes is shown in Figure 17. The digital playback of this event as recorded in SCSN is shown in Figure 18.

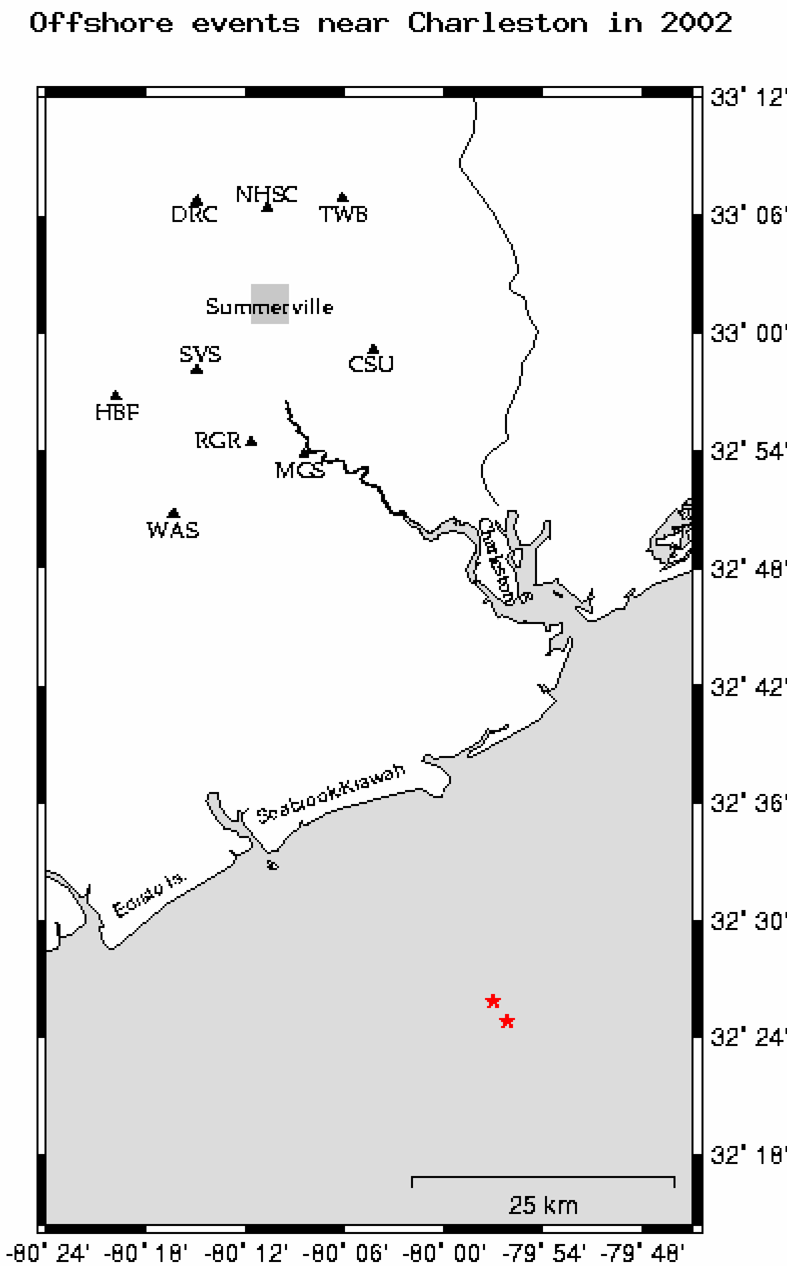


Figure 17: Locations of the earthquakes offshore Seabrook Island in 2002 (red stars). The station locations of the Coastal Plain sub-network are shown as solid triangles.

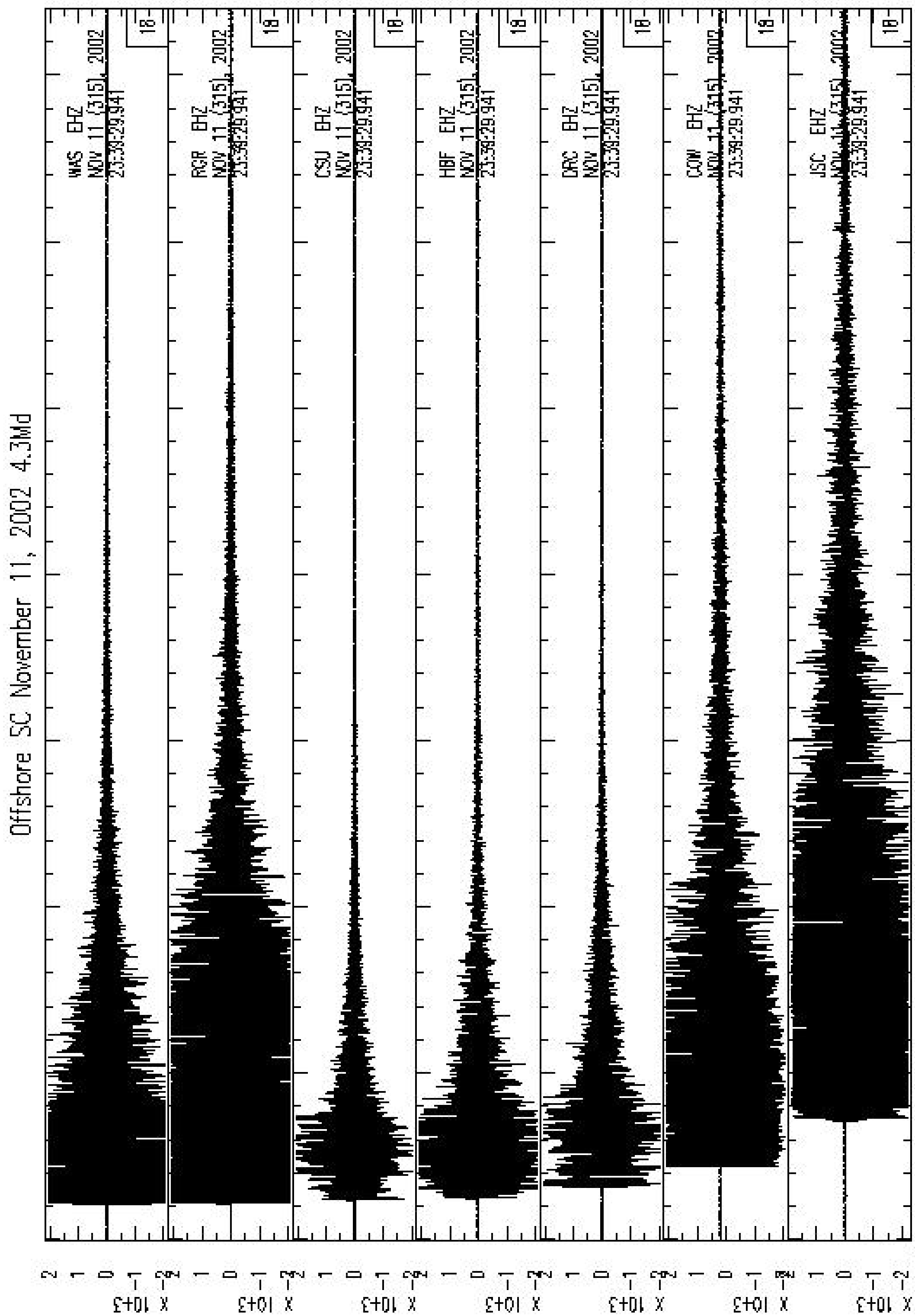


Figure 18: Digital playback of the offshore Seabrook Island November 11, 2002 M_D 4.3 earthquake as recorded by SCSN.

Aside from these, activity continued in the MPSSZ (17 located events) and near Lakes Keowee and Jocassee (2 located events). 115 events with magnitudes less than 2.5 occurred near the Monticello Reservoir. Seismicity in the different regions is discussed below.

Middleton Place Summerville Seismic Zone

The MPSSZ continued to be the most active (non RIS) seismic source zone in the Coastal Plain in 2002 (Figure 19). Seventeen events were located with magnitudes ranging between M_L = 0.7 and M_L = 3.0 at depths shallower than 12 km (Table 3). The seismicity in 2002 was lower than in 2001. Interestingly 6 of the 17 events recorded in 2002 occurred to the north of the main cluster in MPSSZ (near Station MGS) (Figure 19). Those included the three largest events in 2002, including the M 3.0 event on July 26. The depths of the three largest events ranged between 8.5 and 10.8 km. Temporally, the seismicity was distributed throughout the year (SCSN Bulletin, 2002).

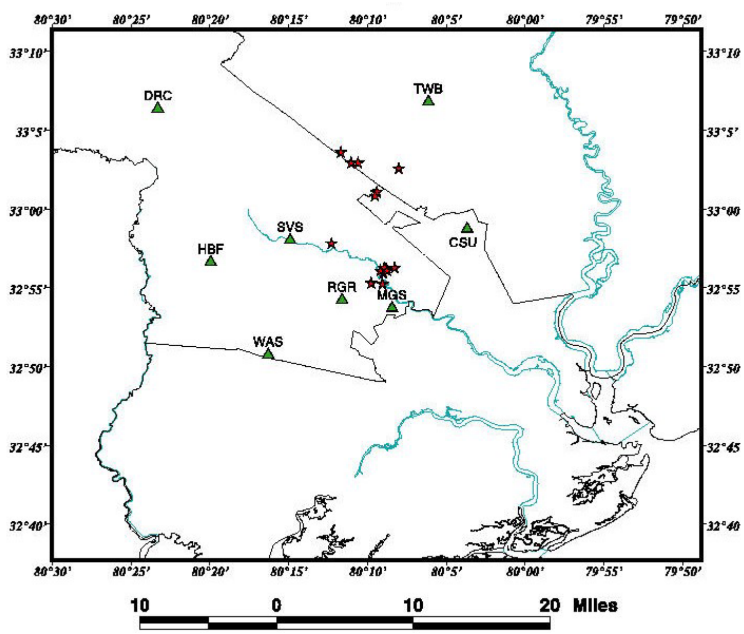


Figure 19: Seismicity in MPSSZ during 2002 (red stars). The station locations are shown as solid green triangles.

Other Tectonic Activity

In 2002, four earthquakes were observed outside regions of RIS and MPSSZ. In over two decades of instrumental recording, an earthquake was recorded off the coast of South Carolina for the first time. In fact, the two largest earthquakes recorded in 2002 occurred ~ 25 km offshore from Seabrook Island, the M_L 3.8 event on November 8, 2002 and the M_L 4.3 event on November 11, 2002 (Figure 17). These events were felt in Seabrook and neighboring islands. They were well recorded on SCSN (Figure 18) and on neighboring networks. Comparison with offshore geophysical data suggest that these events lie along a NW – SE trend, but are not associated with the offshore extension of the Ashley River fault. Rather they seem to lie along the landward projection of the Blake Spur Fracture Zone. These events are being studied in detail.

A series of events occurred on the premises of the Savannah River Plant beginning October 8, 2001. The ultimate event in this series occurred on March 6, 2002, with a M_L 2.2 and was felt. These events were studied by Don Stevenson of the Westinghouse Savannah River Site and a paper has been published in Seismological Research Letters documenting the studies (Stevenson and Talwani, 2004). Locations of the entire series of events preceding up to this event as obtained from Don Stevenson are presented in the paper. It can also be obtained at http://scsn.seis.sc.edu/Publications/ds_srl2004.pdf.

Reservoir Induced Seismicity

Monticello Reservoir

One hundred-fifteen earthquakes were located near Monticello Reservoir area during 2002 (Table 3). They all had a M_L < 2.5. One hundred-five events were located within the reservoir, between stations MR10 and MR01 (Figure 20) and five events were located in the area between Monticello Reservoir and the Broad River. Except for one event, all depths

were shallower than 3 km. There was a marked increase in the number of earthquakes in the months of March and April (SCSN Bulletin, 2002).

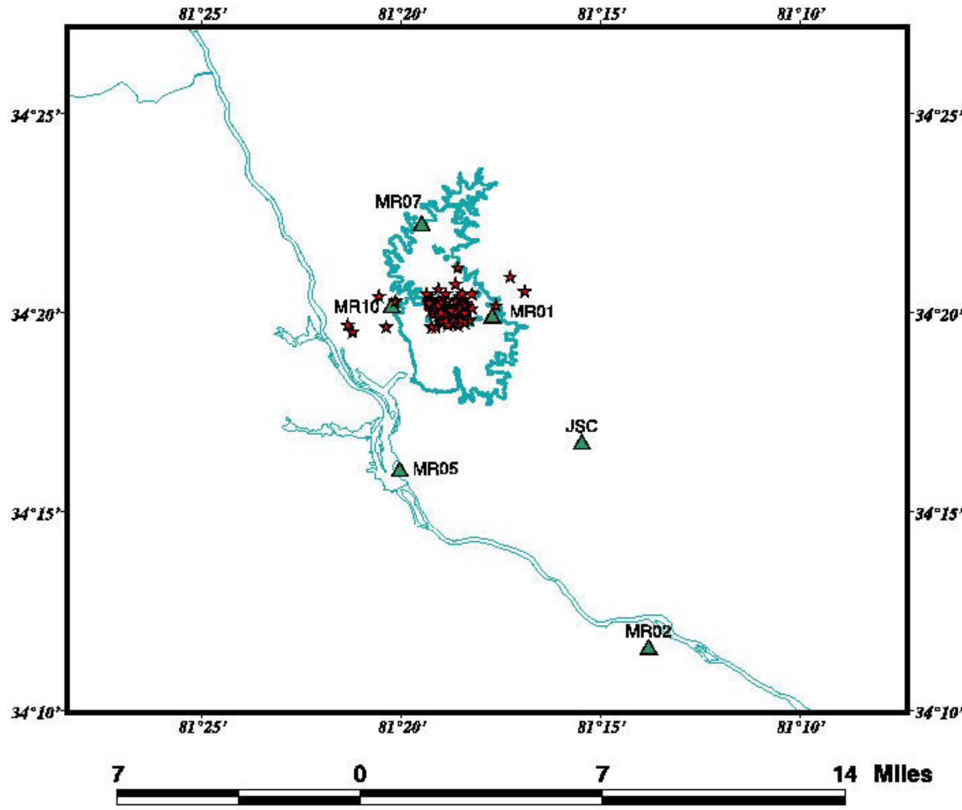


Figure 20: Seismicity near the Monticello Reservoir during 2002 (red stars). The station locations are shown as solid green triangles.

Lake Jocassee

Seismicity at lake Jocassee continued at a low level during 2002 (Table 3). One of the events recorded by the Jocassee sub-network was on February 18, 2002 of M_L 0.7 in the vicinity of Lake Jocassee (Figure 21) and at a depth of 3.1 km (Table 3). The earthquakes occurred in the first and third quarters of the year (SCSN Bulletin, 2002).

Lake Keowee

In 2002, one earthquake was recorded around Lake Keowee (Figure 21). The event was a M_L 2.2 on September 29, 2002 and was not felt. It had a focal depth of 2.4 km.

Bad Creek

No events were located near Bad Creek Reservoir in 2002 (Figure 21).

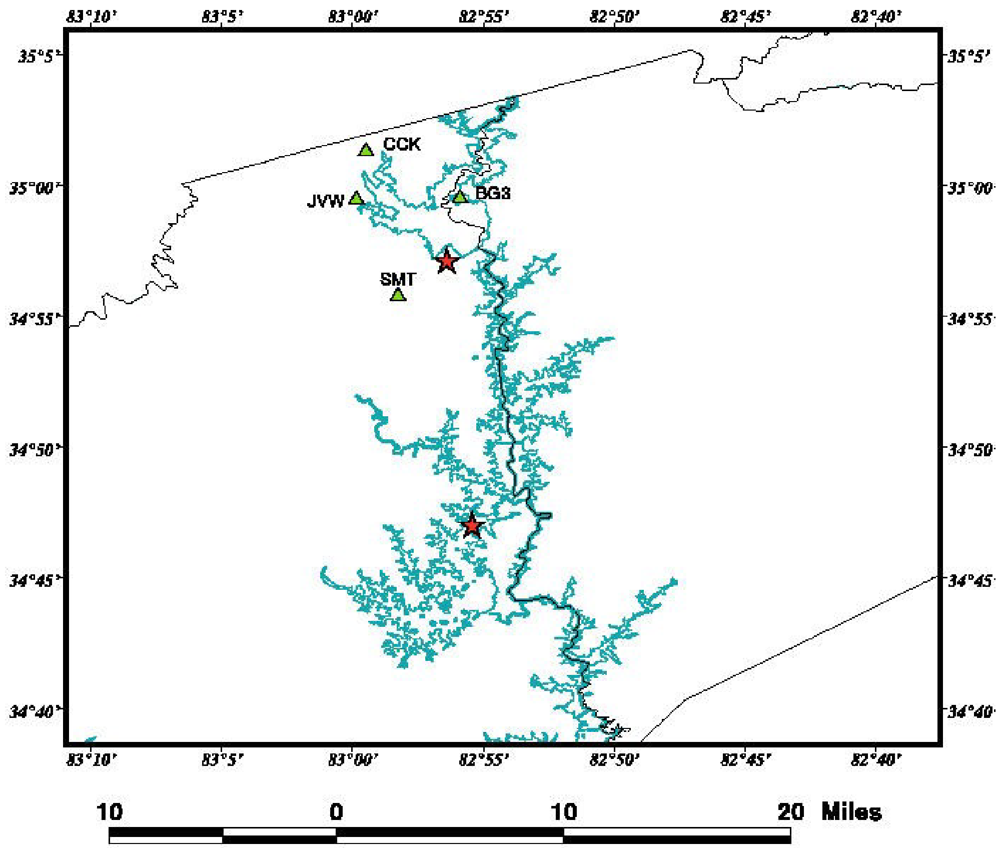


Figure 21: Seismicity near Lake Jocassee during 2002 (red stars). The station locations are shown as solid green triangles.

South Carolina Seismicity - 2003

Seismic activity continued in the MPSSZ (23 located events) (Figure 22) and Monticello Reservoir (12 events) (Figure 23). Seismicity in the different regions is discussed below.

Middleton Place Summerville Seismic Zone

The MPSSZ continued to be the most active (non reservoir induced) seismic source zone in the Coastal Plain in 2003 (Figure 22). Seismic activity was higher in MPSSZ during 2003 compared to that in 2002 when 17 events were located. Twenty three events were

located during 2003 with magnitudes ranging between M_L = 0.9 and M_L = 3.1 at depths shallower than 12 km (Table 4, Figure 22). Most of the seismicity was located in a cluster in MPSSZ with the exception of three events which were located about 5 – 10 miles west, north, and southeast of the cluster respectively (Figure 22). Based on the locations of these events, there is a likelihood of them being associated with the northern and southern legs of the ~N15°E trending Woodstock fault. Temporally, the seismicity was distributed throughout the year (SCSN Bulletin, 2003).

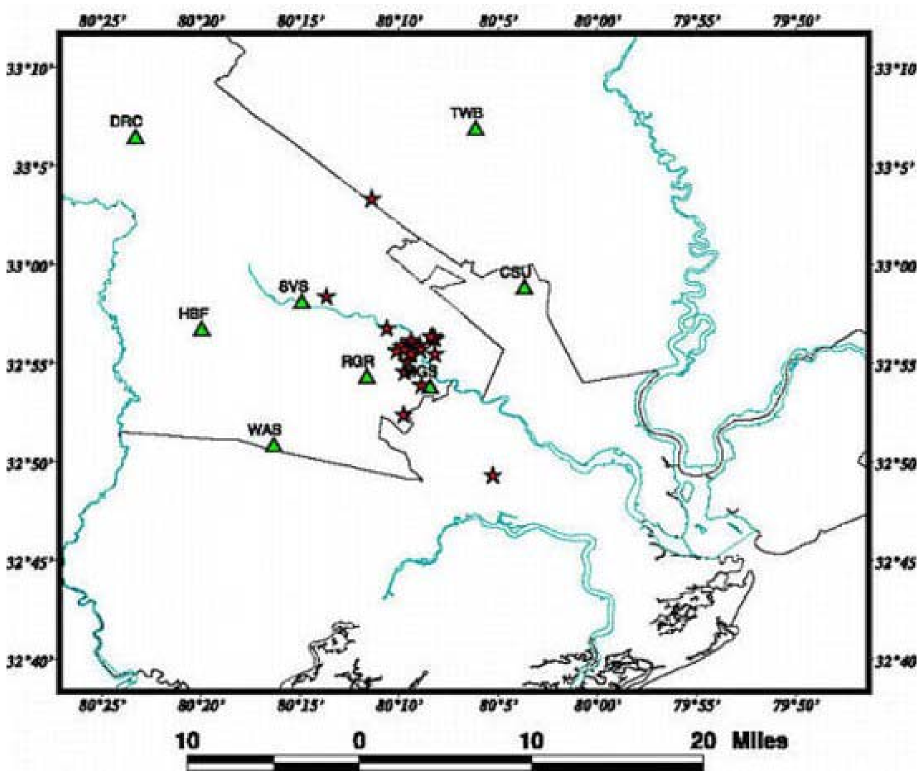


Figure 22: Seismicity in MPSSZ during 2003 (red stars). The station locations are shown as solid green triangles.

Reservoir Induced Seismicity

Monticello Reservoir

The seismic activity near Monticello Reservoir reduced drastically during 2003 compared to that in 2002. Twelve earthquakes were located near Monticello Reservoir area

during 2003 (Table 4, Figure 23) compared to 115 earthquakes in 2002. All of the earthquakes in 2003 had a M_L < 1.2. Except for two events, which had depths of ~3.5 and 7.9 km, all depths were shallower than 3 km.

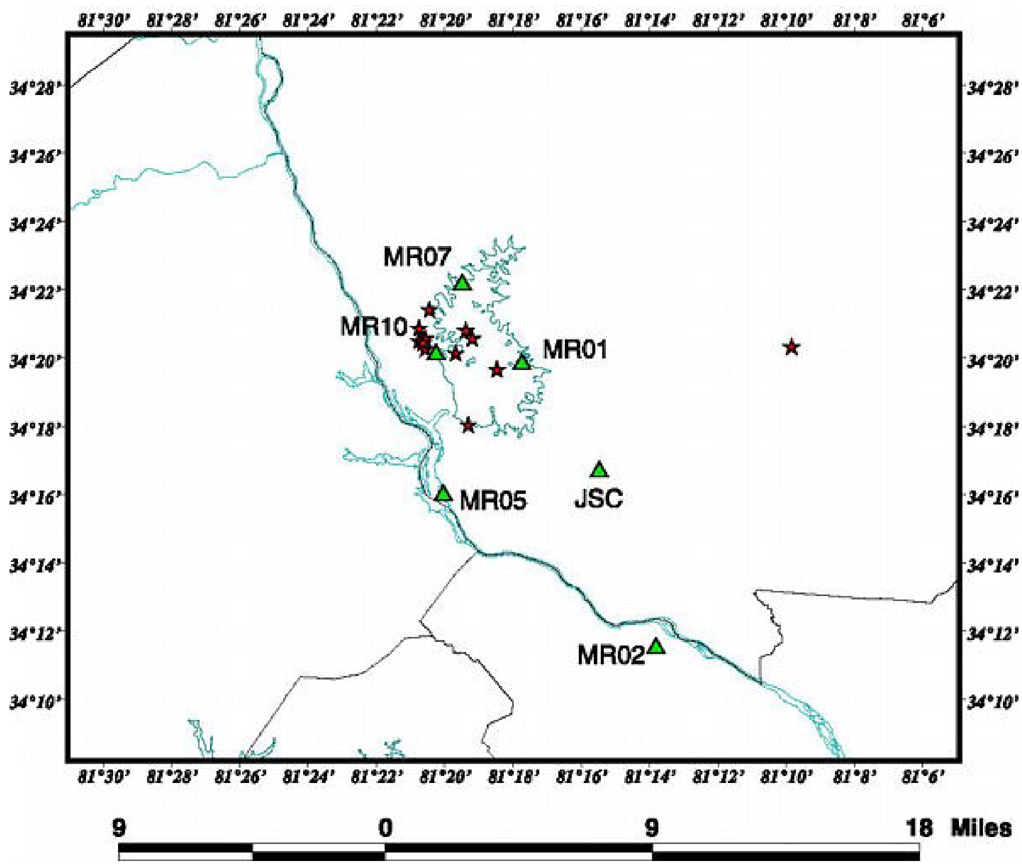


Figure 23: Seismicity near Monticello Reservoir during 2003 (red stars). The station locations are shown as solid green triangles.

Lakes Jocassee, Keowee, and Bad Creek

The local seismic network at lakes Jocassee and Keowee was inoperational during the first half of 2003. It was permanently disconnected on May 22, 2003. Hence no local event was recorded from the region in 2003.

Other Tectonic Activity

Three events of M_L 1.4 – 1.5 were located outside the MPSSZ, and Monticello Reservoir in 2003 (Table 4, Figure 24). These events were located near Columbia and two of them were felt.

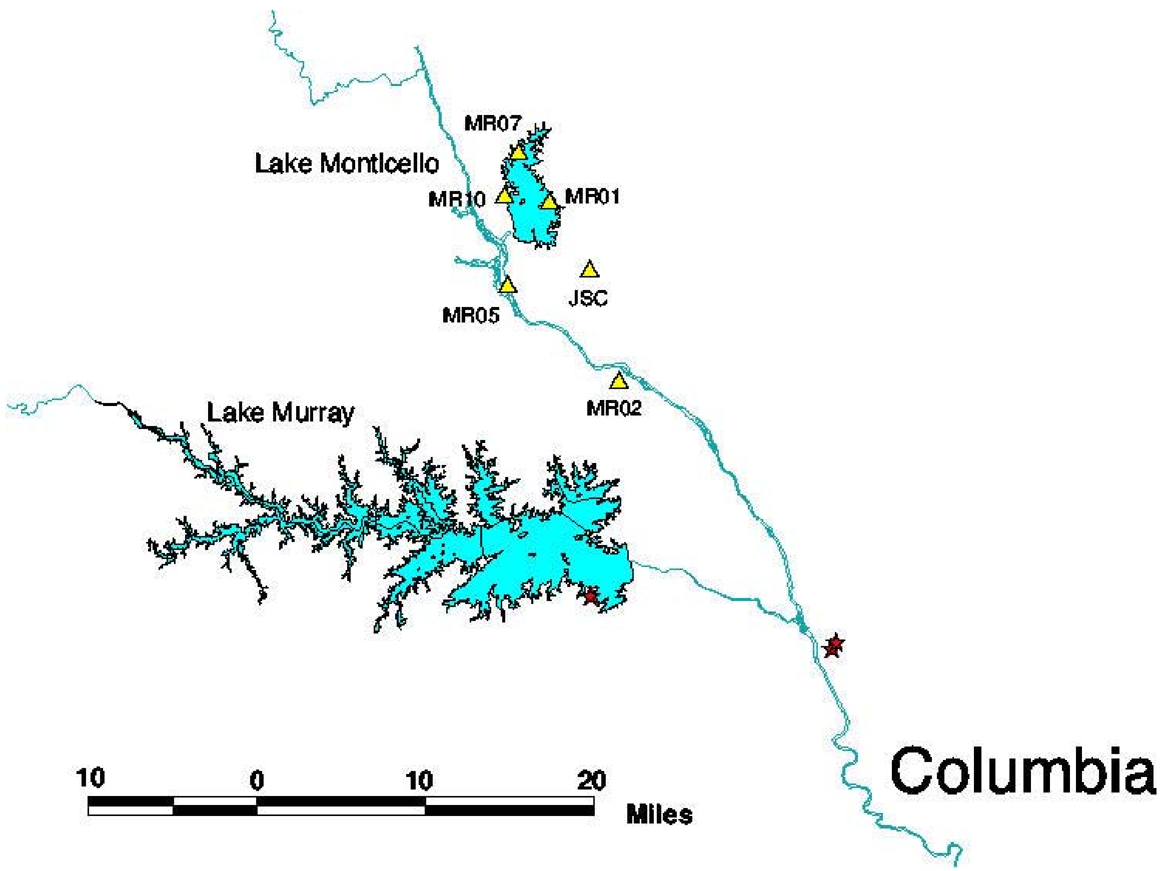


Figure 24: Seismicity in other parts of South Carolina during 2003 (red stars). The station locations are shown as solid yellow triangles.

PROBLEMS OF SCSN AND FUTURE PLANS

As attempts continue to coordinate and integrate the seismic networks of US through the Advanced National Seismic System (ANSS), SCSN strives to play an integral role in achieving the goal. The ANSS requires that every sub-network records seismic data in

SEED format and incorporate a system of automatic transmittal of the raw data to the central ANSS data bank. SCSN is currently not equipped to perform this task. The USGS has promised infrastructural support to SCSN in order to attain this capability. However, the help is still pending. Thus SCSN hopes to attain this capability in near future and come up to speed with the updated national system.

TABLE 1

HYPOELLIPSE FORMAT

Column	1	Date
Column	2	Origin time (UTC) h.m.sec.
Column	3	Latitude (N) degrees, min.
Column	4	Longitude (W) degrees, min.
Column	5	Depth (km)
Column	6	Local duration magnitude.
Column	7	No. of station readings used to locate event. P and S arrivals from same stations are regarded as 2 readings.
Column	8	Largest azimuthal separation in degrees between stations.
Column	9	Epicentral distance in km to nearest station.
Column	10	Root mean square error of time residuals in sec. RMS = Ri2/No, where Ri is the time residual for the ith station.
Column	11	Standard error of the epicenter in km*.
Column	12	Standard error of the focal depth in km*
Column	13	Quality of the epicentral location.

* Statistical interpretation of standard errors involves assumptions which may not be met in earthquake locations. Therefore standard errors may not represent actual error limits.

Note: If ERH or ERZ is blank, this means that it cannot be computed, because of insufficient data.

TABLE 2

Earthquakes in 2001

List of Earthquakes in MPSSZ

Date	Origin	Lat N	Long W	Depth	Mag	No	Gap	DMin	RMS	ERH	ERZ	Quality
20010204	03 34 12.04	32-56.82	80-10.14	6.41	1.6	12	137	5	0.054	0.3	0.6	A
20010211	10 31 34.82	32-58.52	80-10.77	7.56	1.27	12	180	6	0.085	0.5	0.7	A
20010223	14 24 30.37	33-03.14	80-10.03	2.8	1.79	14	114	9	0.097	0.3	0.8	A
20010308	07 34 26.25	32-55.49	80-09.61	11.43	1.74	12	98	3	0.126	0.5	0.5	A
20010310	03 46 48.61	33-00.81	80-11.89	3.32	1.46	6	315	7	0.014	0.8	2.4	B
20010311	11 32 06.68	33-02.37	80-09.26	6.15	2.41	12	101	10	0.098	0.3	1.3	A
20010313	18 46 56.49	32-54.05	80-07.54	8.23	0.86	10	218	1	0.196	0.5	0.7	A
20010324	06 02 39.59	32-54.30	80-10.33	9.39	1.44	14	130	2	0.131	0.3	0.4	A
20010330	23 26 19.00	33-00.81	80-15.36	1.73	1.47	8	150	13	0.146	0.4	27.3	D
20010415	19 43 38.22	32-59.26	80-10.42	7.69	1.34	12	132	7	0.045	0.4	0.8	A
20010428	07 27 03.31	32-55.88	80-09.83	10.82	2.14	12	108	6	0.085	0.3	0.5	A
20010612	10 49 16.31	32-55.10	80-09.57	8.13	2.1	14	95	3	0.074	0.3	0.4	A
20010612	21 29 19.57	32-55.29	80-09.42	7.37	1.62	9	107	3	0.086	0.5	0.6	A
20010614	03 32 30.99	32-54.89	80-09.77	7.55	1.55	10	101	3	0.08	0.4	0.5	A
20010617	17 57 30.76	32-56.63	80-09.22	2.97	1.33	10	132	5	0.138	0.2	0.6	A
20010627	04 36 52.41	32-57.48	80-10.43	7.89	2.18	14	102	6	0.069	0.3	0.6	A
20010722	19 05 06.96	32-57.48	80-10.73	8.19	2.34	14	102	6	0.048	0.3	0.6	A
20010723	02 56 29.42	32-58.93	80-10.18	8.52	1.9	14	125	7	0.07	0.4	0.7	A
20010801	21 53 55.36	32-56.61	80-10.68	7.03	1.5	10	132	4	0.056	0.3	0.6	A
20010829	08 23 48.64	32-55.77	80-09.17	6.04	0.824	8	180	5	0.065	0.4	0.7	A
20010929	07 33 42.80	32-57.25	80-08.50	5.89	1.42	6	260	6	0.026	1.4	2.1	B
20010930	03 59 35.05	32-56.88	80-09.82	7.88	1.88	10	138	5	0.075	0.3	0.6	A
20011001	12 00 35.39	32-58.86	80-06.88	7.86	2.47	12	179	4	0.045	0.6	0.7	A
20011019	22 45 59.66	32-54.02	80-11.38	8.75	1.92	14	139	1	0.121	0.3	0.4	A
20011201	15 17 05.74	32-57.19	80-10.27	6.8	1.84	12	146	5	0.057	0.3	0.6	A

20011208	04 49 34.55	33-02.48	80-09.87	5.65	1.93	12	196	11	0.073	0.3	1.1	B
20011209	10 11 39.68	32-55.84	80-08.52	5.57	0.994	10	131	4	0.076	0.3	0.6	A
20011216	08 04 40.96	32-59.46	80-12.99	5.22	2.17	12	143	4	0.038	0.3	0.6	A
20011219	06 52 02.62	32-56.64	80-09.45	6.75	1.88	8	195	5	0.015	0.8	0.8	A
20011223	05 57 41.72	32-56.04	80-08.92	6.29	2.75	18	118	4	0.078	0.3	0.5	A

List of Earthquakes outside of MPSSZ, Monticello Reservoir, and Lakes Jocassee and Keowee

Date	Origin	Lat N	Long W	Depth	Mag	No	Gap	DMin	RMS	ERH	ERZ	Quality
20010318	16 22 32.46	34-42.56	81-32.45	5.42	2.12	14	187	42	0.09	0.7	2.1	C
20010611	15 29 49.94	34-43.27	81-16.82	8.72	1.84	14	295	39.1	0.06	0.6	2.8	C
20010817	05 59 46.06	34-23.13	82-31.64	4.57	1.93	14	229	71	0.11	0.5	0.5	A
20010902	13 56 09.80	33-52.13	82-22.23	5	2.4	20	109	82	0.35	0.2	0.4	A
20010919	23 25 42.04	33-15.51	81-15.52	5.69	1.49	8	139	13	0.06	3	6.5	D
20011008	00 23 01.22	33-19.20	81-39.51	3.9	2.5	(SRS	located)					
20011008	02 56 07.00	33-19.06	81-40.29	4.14	1	(SRS	located)					
20011008	08 53 50.00	33-20.24	81-40.88	4.22	1.4	(SRS	located)					
20011014	06 05 08.54	33-20.86	81-39.75	2.97	0.73	6	220	10	0.02	1	1.9	C

List of Earthquakes near Monticello Reservoir

Date	Origin	Lat N	Long W	Depth	Mag	No	Gap	DMin	RMS	ERH	ERZ	Quality
20010210	06 36 28.48	34-19.80	81-19.20	0.3	0.01	12	103	1.8	0.04	0.1	0.4	A
20010310	02 58 05.13	34-20.17	81-18.34	0.52	0.82	13	96	1	0.04	0.2	0.5	A
20010310	03 59 41.99	34-20.23	81-18.24	0.97	0.37	12	155	1	0.05	0.2	0.3	A
20010310	04 01 09.54	34-20.49	81-18.55	0.13	0.01	10	155	1.6	0.13	0.5	1.4	B
20010411	02 39 09.38	34-20.01	81-18.26	0.7	0.11	10	128	0.8	0.04	0.2	0.3	A
20010411	02 39 13.84	34-20.01	81-18.13	1.26	0.12	10	134	0.6	0.05	0.3	0.3	A
20010411	02 45 59.71	34-19.93	81-18.34	1.07	0.24	10	123	0.9	0.06	0.3	0.4	A
20010412	02 55 02.72	34-20.01	81-18.26	0.72	0.95	14	95	0.8	0.06	0.2	0.3	A
20010415	22 57 59.54	34-21.07	81-18.25	0.94	0.44	12	195	2.3	0.05	0.2	0.9	B
20010417	19 39 29.79	34-20.94	81-18.43	1.32	0.12	10	185	2.2	0.01	0.1	0.2	A
20010421	04 38 08.61	34-20.01	81-18.16	0.83	0.29	10	132	0.7	0.03	0.2	0.3	A
20010421	04 45 10.40	34-20.01	81-18.09	1.18	0.21	10	137	0.6	0.04	0.2	0.2	A

20010421	19 59 43.85	34-20.12	81-18.06	0.88	0.21	12	158	0.6	0.05	0.2	0.3	A
20010427	01 15 44.78	34-19.68	81-19.46	1.07	0.12	12	120	1.5	0.04	0.2	0.4	A
20010427	08 25 57.43	34-19.59	81-19.47	0.6	0.01	8	181	1.6	0.02	0.2	0.4	A
20010429	15 05 56.50	34-19.99	81-19.58	0.8	1.75	14	103	1.1	0.08	0.3	0.4	B
20010508	05 08 28.61	34-17.33	81-11.09	3.26	0.95	14	143	7	0.04	0.2	1	B
20010707	08 37 55.44	34-20.40	81-19.29	1.7	0.82	12	117	1.5	0.07	0.3	0.5	A

List of Earthquakes near Lakes Jocassee and Keowee

Date	Origin	Lat N	Long W	Depth	Mag	No	Gap	DMin	RMS	ERH	ERZ	Quality
20010131	22 02 12.98	34-57.59	82-57.84	1.95	. 450	8	153	3	0.025	0.3	1.6	B
20010416	02 58 53.84	34-57.74	82-57.70	3.06	0.146	8	155	4	0.024	0.4	0.9	A
20010628	22 04 25.52	34-57.28	82-55.75	6.05	2.18	8	162	4	0.081	1.3	1.3	B

TABLE 3

Earthquakes in 2002

List of Earthquakes in MPSSZ

Date	Origin	Lat N	Long W	Depth	Mag	No	Gap	DMin	RMS	ERH	ERZ	Quality
20020107	17 0912.19	32-55.89	80-08.98	5.8	0.7	10	117	4	0.08	0.3	0.6	A
20020111	13 30 22.06	32-56.20	80-08.79	6.13	2.7	16	121	4	0.07	0.3	0.5	A
20020111	13 53 58.89	32-56.27	80-08.96	6.74	1.9	10	124	4	0.05	0.4	0.7	A
20020122	23 11 45.43	32-56.12	80-08.73	6.73	1.1	10	123	4	0.03	0.3	0.7	A
20020128	07 49 06.78	33-01.08	80-09.40	4.71	2.4	18	89	9	0.09	0.2	1.1	A
20020202	18 29 03.89	33-00.81	80-09.54	7.71	2.2	12	139	9	0.08	0.4	0.7	A
20020313	20 57 26.69	32-55.16	80-09.18	7.64	2.2	12	222	4	0.23	0.5	0.6	A
20020428	00 02 11.52	32-56.12	80-09.16	6.94	2.3	10	121	4	0.09	0.4	0.7	A
20020530	08 23 13.02	32-57.81	80-12.31	10.11	1.9	12	161	4	0.05	0.5	0.5	A
20020707	02 40 51.05	33-02.58	80-08.01	10.83	2.9	12	117	8	0.05	0.5	0.9	A
20020716	02 08 39.45	32-56.27	80-08.27	6.67	2.8	20	134	4	0.09	0.3	0.5	A

20020716	02 20 12.04	32-56.29	80-08.25	7.15	2.3	16	135	4	0.08	0.3	0.5	A
20020726	21 07 03.01	33-03.57	80-11.67	10.01	3	18	128	11	0.07	0.2	0.5	A
20020921	02 57 28.64	32-55.33	80-09.78	8.23	2	12	108	3	0.13	0.4	0.6	A
20021001	02 03 07.79	32-55.48	80-10.17	5.74	1.1	10	110	3	0.06	0.3	0.6	A
20021129	06 42 04.39	33-02.95	80-10.64	9.09	2.5	12	115	10	0.07	0.3	0.7	A
20021216	05 32 30.81	33-02.95	80-11.04	8.46	2.8	14	161	6	0.05	0.3	0.8	A

List of Earthquakes outside of MPSSZ, Monticello Reservoir, and Lakes Jocassee and Keowee

Date	Origin	Lat N	Long W	Depth	Mag	No	Gap	DMin	RMS	ERH	ERZ	Quality
20020306	00 12 32.83	33-21.62	81-35.27	9.23	2.2	12	262	98	0.11	0.7	1	A
20021108	13 29 03.18	32-25.27	79-56.97	3.96	3.8	17	337	56	0.14	1.7	0.9	B
20021111	23 39 29.72	32-24.26	79-56.18	2.42	4.3	20	301	58	0.21	2.5	1.6	B

List of Earthquakes near Monticello Reservoir

Date	Origin	Lat N	Long W	Depth	Mag	No	Gap	DMin	RMS	ERH	ERZ	Quality
20020220	05 11 46.17	34-20.26	81-20.15	0.87	0	8	150	2	0.06	0.6	0.6	A
20020225	16 23 48.78	34-19.47	81-21.27	0.7	0.2	10	224	2	0.07	0.5	0.7	A
20020319	12 25 57.25	34-19.80	81-19.01	0.93	0.4	10	97	2	0.04	0.2	0.9	A
20020320	03 08 42.57	34-19.89	81-18.65	1.71	0.6	12	105	1	0.04	0.4	0.6	A
20020323	04 41 06.57	34-19.84	81-18.94	0.67	0.5	12	96	2	0.04	0.3	0.5	A
20020323	05 01 11.70	34-19.80	81-19.01	1.21	0.6	8	154	2	0.01	0.4	0.8	A
20020323	06 44 19.38	34-19.76	81-19.02	0.58	0.6	12	99	2	0.03	0.3	0.9	A
20020323	07 10 28.81	34-20.10	81-18.37	1.65	0.8	10	133	1	0.04	0.7	0.6	A
20020323	08 20 59.27	34-19.96	81-18.68	1.35	0.6	12	109	1	0.06	0.4	0.7	A
20020323	09 15 01.55	34-20.03	81-18.95	0.69	1.6	12	108	2	0.03	0.3	0.6	A
20020323	09 34 14.81	34-20.34	81-18.59	0.7	0.8	10	142	2	0.13	0.3	0.7	A
20020323	09 36 15.64	34-19.90	81-18.86	0.8	0.4	8	146	2	0.03	0.5	1.3	B
20020323	10 06 22.10	34-20.00	81-18.60	1.59	0.7	8	136	1	0.02	0.6	0.6	A
20020323	10 09 02.20	34-19.88	81-18.79	1.19	0.3	12	131	2	0.04	0.3	0.6	A
20020323	10 26 09.23	34-19.85	81-18.95	0.54	0.3	12	97	2	0.02	0.3	0.9	A
20020323	11 07 20.19	34-19.77	81-18.95	1.09	0.5	8	155	2	0.02	0.4	0.8	A

20020323	12 39 34.52	34-20.12	81-18.69	0.72	0.9	8	131	2	0.05	0.5	1.1	B
20020323	14 33 24.75	34-19.85	81-18.83	1.2	0.9	12	99	2	0.04	0.3	0.7	A
20020323	16 09 17.06	34-19.80	81-19.00	0.6	0.3	12	97	2	0.03	0.3	0.9	A
20020323	18 02 20.71	34-19.76	81-18.95	0.69	0.9	12	98	2	0.02	0.3	0.5	A
20020323	22 17 20.19	34-19.87	81-18.87	0.31	1.1	8	150	2	0.01	0.5	1.1	B
20020324	00 24 46.56	34-19.81	81-18.73	1.48	0.5	12	97	2	0.05	0.3	0.6	A
20020324	00 25 24.55	34-19.75	81-18.96	0.7	1.2	12	98	2	0.03	0.3	0.5	A
20020324	00 29 22.56	34-19.78	81-18.78	1.56	0.2	8	153	2	0.03	0.5	1.2	B
20020324	03 44 21.06	34-19.72	81-18.74	1.46	0.9	10	94	2	0.02	0.3	0.7	A
20020324	03 46 13.03	34-19.91	81-18.61	1.64	0.9	12	107	1	0.05	0.4	0.6	A
20020324	07 01 45.06	34-19.83	81-18.82	0.42	0.3	8	149	2	0.05	0.4	1.3	B
20020324	18 05 02.64	34-20.10	81-18.89	1.11	0.7	10	114	2	0.05	0.3	0.8	A
20020325	22 37 07.45	34-19.64	81-19.15	1.25	1	8	139	2	0.01	0.5	1.4	B
20020329	00 54 37.85	34-20.08	81-18.88	2	1.4	12	113	2	0.05	0.3	0.5	A
20020329	00 58 54.26	34-20.07	81-18.63	0.63	0.2	8	133	1	0.02	0.4	0.6	A
20020329	01 00 00.08	34-19.99	81-18.86	1.3	0.3	8	141	2	0.02	0.4	0.7	A
20020329	01 24 11.49	34-19.94	81-18.93	0.66	0.1	8	145	2	0.02	0.4	0.6	A
20020329	01 33 49.06	34-19.96	81-18.83	1.26	0.8	10	107	2	0.02	0.4	0.9	A
20020329	01 34 25.21	34-19.96	81-18.95	0.82	-0.1	8	143	2	0.02	0.5	1.3	B
20020329	04 45 12.18	34-20.11	81-18.69	0.67	-0.6	8	132	1	0.08	0.3	0.7	A
20020329	06 51 54.04	34-20.10	81-18.43	1.6	0.2	8	130	1	0.02	0.6	0.6	A
20020329	07 55 35.96	34-19.83	81-18.91	1.66	0.6	10	96	2	0.07	0.3	0.6	A
20020331	02 10 14.34	34-20.02	81-19.05	0.86	1	8	264	2	0.04	0.7	1.9	B
20020331	02 58 23.88	34-19.87	81-18.91	1.02	0.5	8	254	2	0.33	0.6	1.4	B
20020331	03 23 26.04	34-19.94	81-19.00	0.89	0.9	10	157	2	0.04	0.4	1.5	B
20020331	04 03 08.58	34-19.81	81-18.67	0.66	0.6	8	246	1	0.08	1	1.6	B
20020331	10 24 55.18	34-19.94	81-19.07	0.95	0.9	10	160	2	0.06	0.4	1.4	B
20020331	13 21 08.20	34-19.94	81-18.98	1.65	1.3	10	157	2	0.03	0.4	0.9	A
20020331	17 14 21.12	34-20.00	81-18.99	2.41	1.6	10	157	2	0.05	0.5	0.7	A
20020401	06 35 46.92	34-20.02	81-18.94	1.06	1.1	10	155	2	0.03	0.5	1.2	B
20020401	07 10 48.94	34-19.97	81-19.94	2.52	1.7	10	156	2	0.06	0.4	0.7	A
20020401	09 51 33.66	34-19.75	81-18.86	0.88	0.6	8	245	2	0.06	0.7	1.7	B
20020402	19 17 56.65	34-20.02	81-19.10	1.75	0.9	10	176	2	0.02	0.5	0.8	A

20020403	17 12 12.78	34-20.14	81-18.94	1.3	1.3	12	115	2	0.04	0.3	0.6	A
20020407	06 57 49.27	34-20.29	81-19.09	1.74	0.6	6	205	2	0.02	0.9	0.9	A
20020407	11 44 21.31	34-20.19	81-18.89	0.86	0.9	10	197	2	0.08	1	1.5	B
20020407	11 52 57.19	34-20.57	81-19.10	2.35	0.8	12	131	2	0.07	0.3	0.5	A
20020407	12 26 10.54	34-20.05	81-19.16	2.67	1.3	12	104	2	0.06	0.3	0.5	A
20020407	13 31 09.32	34-19.99	81-19.13	1.33	0.9	10	172	2	0.03	0.5	1	A
20020407	16 06 24.64	34-20.43	81-18.87	1.42	0.9	10	222	1	0.04	0.8	0.8	A
20020407	18 19 21.33	34-20.02	81-19.12	1.52	0.9	12	103	2	0.03	0.3	0.6	A
20020407	19 39 49.97	34-20.05	81-19.21	1.81	0.5	10	178	2	0.03	0.5	0.8	A
20020408	02 04 06.87	34-19.99	81-19.22	1.62	1	10	171	2	0.07	0.5	0.8	A
20020414	16 49 34.18	34-20.29	81-19.28	2.08	2.3	12	112	2	0.07	0.3	0.5	A
20020414	16 58 51.05	34-19.91	81-19.07	0.82	0.8	10	164	2	0.05	0.6	1.8	B
20020414	20 20 24.35	34-20.23	81-18.99	1.5	1	10	199	2	0.03	0.5	0.9	A
20020415	04 20 19.44	34-20.04	81-19.24	2.16	1.5	11	101	2	0.05	0.3	0.6	A
20020415	04 20 38.05	34-20.21	81-19.31	1.65	1.8	12	107	1	0.04	0.3	0.6	A
20020415	04 59 32.71	34-20.34	81-19.27	1.91	1.1	11	115	2	0.03	0.3	0.6	A
20020415	05 15 03.81	34-20.32	81-19.25	1.88	0.4	6	208	2	0.03	0.9	0.8	A
20020415	06 22 27.15	34-20.72	81-18.68	1.81	0.4	6	248	2	0.04	1	1.5	A
20020415	09 13 10.80	34-19.59	81-19.28	1.3	0	6	175	2	0.01	0.9	1.8	B
20020418	03 37 39.18	34-20.05	81-18.88	0.76	0.6	10	182	2	0.04	0.6	1.7	B
20020418	04 12 15.54	34-20.06	81-18.85	1.17	1.2	12	113	2	0.03	0.3	0.7	A
20020427	10 49 17.22	34-20.18	81-19.19	1.68	0.9	10	193	2	0.04	0.5	0.8	A
20020430	06 12 14.29	34-20.28	81-19.29	1.39	1	10	203	1	0.08	0.5	0.8	A
20020502	03 09 07.45	34-20.30	81-19.27	2.12	1.1	10	205	2	0.05	0.5	0.6	A
20020502	22 38 23.92	34-20.43	81-19.39	2.7	0.7	10	114	1	0.04	0.3	0.5	A
20020503	00 17 25.85	34-20.18	81-19.05	0.67	0.9	10	114	2	0.03	0.3	0.7	A
20020504	04 00 06.22	34-20.10	81-18.63	1.13	0.9	12	123	1	0.03	0.3	0.6	A
20020504	04 02 42.95	34-20.13	81-18.55	0.82	0.8	12	128	1	0.04	0.3	0.8	A
20020504	04 05 12.67	34-20.35	81-18.48	0.58	0.6	10	149	1	0.04	0.3	0.7	A
20020504	04 07 54.88	34-20.37	81-18.56	1.06	0.4	8	146	2	0.03	0.5	0.8	A
20020504	04 11 49.74	34-20.19	81-19.34	1.12	0.9	12	105	1	0.06	0.3	0.7	A
20020504	05 56 29.26	34-20.14	81-19.05	1.72	1.1	12	111	2	0.03	0.3	0.6	A
20020521	23 28 42.11	34-20.23	81-18.58	0.63	0.6	10	135	1	0.04	0.3	0.6	A

20020522	01 56 26.68	34-20.29	81-18.65	0.61	0.2	10	136	2	0.05	0.3	0.6	A
20020905	21 45 57.81	34-20.44	81-18.47	2.5	1.2	10	231	1	0.04	0.8	0.6	A
20020907	03 41 00.75	34-19.95	81-18.73	0.67	1.6	10	173	2	0.03	0.8	1.3	B
20020907	04 04 33.89	34-19.80	81-18.74	1.22	0.9	10	156	2	0.03	0.5	1	B
20020907	12 59 43.69	34-19.28	81-18.81	1.06	0.9	10	158	2	0.06	0.5	1.2	B
20020907	13 01 17.27	34-19.85	81-18.71	1.4	0.2	8	161	1	0.04	0.5	1	B
20020907	13 18 11.82	34-19.92	81-18.72	1.36	0.3	8	169	2	0.04	0.5	1	B
20020907	23 20 42.99	34-19.96	81-18.65	1.74	0.9	10	175	1	0.04	0.5	0.7	A
20020908	00 32 40.85	34-19.96	81-18.49	1.83	0.5	10	176	1	0.03	0.5	0.7	A
20020908	03 21 58.52	34-19.85	81-18.74	1.62	1.3	10	161	2	0.03	0.5	0.8	A
20020908	03 43 01.13	34-19.75	81-18.44	1.83	0.1	10	149	1	0.04	0.5	0.7	A
20020908	04 27 30.20	34-19.76	81-18.78	1.11	0.8	10	151	2	0.04	0.5	1.2	B
20020908	04 38 19.75	34-19.78	81-18.71	1.47	0.3	8	153	2	0.03	0.5	1	B
20020908	04 39 13.59	34-19.82	81-18.88	1.23	0.2	10	157	2	0.03	0.5	1.1	B
20020909	01 52 26.72	34-20.19	81-18.39	1.13	0.9	10	208	1	0.04	0.6	0.7	A
20020909	04 48 32.72	34-20.48	81-18.24	3.23	0.2	8	244	1	0.07	0.9	0.6	B
20020909	09 16 41.49	34-19.67	81-18.84	1.26	0.9	10	142	2	0.05	0.5	1.1	B
20020909	20 14 38.98	34-20.09	81-18.51	2.89	1	10	192	1	0.05	0.7	0.7	A
20020910	13 02 14.17	34-19.84	81-18.57	1.66	0.9	10	161	1	0.03	0.5	0.8	A
20020913	04 00 28.48	34-20.16	81-18.43	1.37	0.9	10	203	1	0.02	0.5	0.7	A
20020914	23 38 12.87	34-20.03	81-18.75	2.16	0.8	8	181	2	0.03	0.5	0.7	A
20020919	14 53 31.43	34-20.37	81-20.58	1.72	1.3	10	287	1	0.05	0.5	0.5	A
20020920	06 18 04.09	34-19.70	81-21.38	2.31	1.8	10	260	2	0.05	0.5	0.7	A
20021113	02 33 33.45	34-20.13	81-17.67	1.44	1.1	5	318	0	0	3.2	1.2	C
20021113	03 16 31.20	34-20.49	81-16.94	1.63	0.6	6	295	2	0.06	3.4	3.2	C
20021115	09 01 40.11	34-19.69	81-18.58	1.26	0.6	8	151	1	0.02	0.4	0.7	A
20021115	09 06 39.55	34-19.77	81-18.51	1.34	0.8	8	146	1	0.02	0.5	0.7	A
20021123	01 08 31.32	34-19.59	81-20.42	0.9	0.5	10	228	1	0.05	0.6	0.7	A
20021123	05 16 31.78	34-19.78	81-18.30	0.88	0.7	10	128	1	0.03	0.4	0.7	A
20021123	06 50 14.49	34-19.81	81-18.32	1.22	0.4	10	128	1	0.04	0.4	0.6	A
20021125	12 03 18.49	34-20.11	81-18.27	1.46	0.9	10	140	1	0.06	0.4	0.5	A
20021125	12 40 15.63	34-19.96	81-18.40	0.55	0.9	8	135	1	0.03	0.6	0.8	A
20021207	02 59 58.83	34-19.97	81-19.04	1.47	0.9	10	129	2	0.03	0.5	0.7	A

List of Earthquakes near Lakes Jocassee and Keowee

Date	Origin	Lat N	Long W	Depth	Mag	No	Gap	DMin	RMS	ERH	ERZ	Quality
20020218	02 51 53.63	34-57.10	82-56.41	3.1	0.7	6	301	5	0.03	1.1	1.7	B
20020929	05 19 45.97	34-34.04	82-55.41	2.42	2.2	6	315	6	0.05	2.3	1.5	C

TABLE 4

Earthquakes in 2003

List of Earthquakes in MPSSZ

Date	Origin	Lat N	Long W	Depth	Mag	No	Gap	DMin	RMS	ERH	ERZ	Quality
20030201	06 49 11.13	32-55.88	80-09.26	5.51	2.125	12	117	4	0.06	0.3	0.7	A
20030226	09 42 39.34	32-56.15	80-09.41	7.92	2.125	12	122	4	0.06	0.4	0.6	A
20030228	07 02 36.52	32-55.90	80-09.01	4.33	2.58	12	117	4	0.03	0.3	0.6	A
20030302	17 18 26.49	32-55.87	80-09.90	6.53	2.886	14	93	4	0.08	0.3	0.5	A
20030315	09 02 24.44	32-55.07	80-09.61	5.76	0.92	10	104	3	0.09	0.3	0.5	A
20030315	15 56 48.91	32-56.21	80-08.24	5.43	2.271	12	136	4	0.04	0.3	0.7	A
20030315	16 24 54.73	32-56.31	80-08.26	5.33	1.977	12	134	5	0.07	0.3	0.7	A
20030430	03 54 24.77	32-54.55	80-09.72	6.58	1.558	10	120	2	0.07	0.6	0.5	A
20030505	10 53 49.87	33-03.31	80-11.38	11.4	3.097	10	123	10	0.07	0.3	0.7	A
20030612	23 33 17.27	32-58.35	80-13.67	10.24	2.62	16	140	2	0.06	0.3	0.5	A
20030719	14 22 21.31	32-55.42	80-08.22	5.7	2.525	12	146	3	0.04	0.7	0.7	A
20030924	10 31 29.88	32-53.86	80-08.89	4.89	1.002	9	155	1	0.07	0.5	0.4	A
20031012	09 07 43.49	32-49.31	80-05.30	11.9	2.975	10	274	10	0.37	1.7	1.7	B
20031014	10 45 38.62	32-56.75	80-10.59	7.22	2.494	14	135	5	0.09	0.3	0.6	A
20031020	05 59 32.01	32-55.51	80-09.46	7.01	1.427	10	102	3	0.05	0.6	0.6	A
20031022	23 36 27.90	32-58.99	80-09.93	7.49	2.384	13	78	8	0.07	0.3	0.7	A
20031028	16 42 43.51	32-55.60	80-10.17	7.39	1.668	10	149	3	0.05	0.8	0.6	A
20031118	06 49 13.75	32-52.40	80-09.77	3.39	1.081	8	217	3	0.05	0.5	0.7	A
20031201	09 18 19.62	32-56.35	80-08.36	8.44	2.149	8	175	5	0.04	0.9	0.7	A

20031202	21 21 31.11	32-55.66	80-08.96	5.4	1.347	10	118	3	0.05	0.6	0.9	A
20031222	07 32 12.52	32-55.72	80-09.73	10.16	1.812	8	181	4	0.05	1	0.6	A
20031222	23 50 26.04	32-55.44	80-09.44	5.6	3.016	14	103	3	0.07	0.3	0.6	A
20031222	23 53 59.94	32-54.26	80-09.06	6.71	1.487	12	113	1	0.08	0.6	0.4	A

List of Earthquakes outside of MPSSZ, Monticello Reservoir, and Lakes Jocassee and Keowee

Date	Origin	Lat N	Long W	Depth	Mag	No	Gap	DMin	RMS	ERH	ERZ	Quality
20030404	23 01 46.59	33-59.17	81-01.91	0.46	1.39	17	165	6	0.07	0.3	1.4	B
20030508	11 33 05.99	33-59.31	81-03.15	0.89	1.501	10	355	28	0.07	4.2	99	D
20031211	20 00 52.16	33-59.80	81-02.77	1.11	1.503	10	354	28	0.07	5.4	99	D

List of Earthquakes near Monticello Reservoir

Date	Origin	Lat N	Long W	Depth	Mag	No	Gap	DMin	RMS	ERH	ERZ	Quality
20030114	04 27 49.42	34-18.06	81-19.31	3.43	0.799	10	195	4	0.06	0.7	1	A
20030115	04 49 16.09	34-20.87	81-20.87	0.83	0.824	10	248	1	0.06	0.8	0.8	A
20030120	14 36 16.70	34-20.18	81-19.65	1.34	0.695	8	136	1	0.04	0.4	0.7	A
20030617	10 49 22.21	34-19.70	81-18.49	1.49	0.931	8	149	1	0.03	0.7	0.8	A
20030621	23 40 06.85	34-20.80	81-19.36	0.9	1.176	10	128	2	0.04	0.3	0.8	A
20030622	23 09 56.92	34-20.51	81-20.78	0.62	0.929	8	260	1	0.01	0.7	0.6	A
20030827	05 10 23.93	34-20.36	81-09.85	7.89	0.162	6	294	11	0.45	5.5	7.6	D
20030926	23 35 58.71	34-20.57	81-20.55	1.31	0.731	8	318	1	0.06	0.6	0.6	A
20030927	15 03 58.12	34-20.25	81-20.58	0.89	0.899	8	311	1	0.06	0.6	0.5	A
20030930	08 34 49.03	34-20.44	81-20.62	1.03	0.31	8	315	1	0.06	0.6	0.5	A
20031125	18 53 52.80	34-21.43	81-20.46	0.64	0.006	7	230	2	0.04	1.1	1.5	B
20031218	05 51 31.96	34-20.57	81-19.18	0.69	0.741	9	127	2	0.03	0.4	0.7	A

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